4-13-2011

6th Annual Focus on Creative Inquiry Poster Forum Program

Clemson University

6th Annual
Focus on Creative Inquiry
Poster Forum

April 13, 2011
Sponsored by
Undergraduate Studies
The Graduate School
Calhoun Honors College

The poster forum today displays a few of the more than 400 projects initiated by Clemson University Creative Inquiry teams.

What is Creative Inquiry? It is small-group learning for all students. It is the imaginative combination of engaged learning and undergraduate research. Ultimately, it is the creation of an Ah-ha! Moment — and it is unique to Clemson University.

Creative Inquiry establishes small teams of undergraduate students that work with faculty mentors to take on problems that spring from their own curiosity, from a professor's challenge, or from the pressing needs of the world around them. Students take ownership of their projects. They ask questions, they take risks, and they get answers.

Students may join Creative Inquiry teams as freshmen and continue through graduation.
They hone critical-thinking and problem-solving skills as they learn to work in a team — sometimes as a leader, sometimes as a follower. They present their work at national and international conferences, where they field questions from professionals and researchers.

These are the skills today's employers are seeking. "We want all of our graduates to be thinkers, leaders and entrepreneurs," says Provost Dori Helms. "We want them to be able to approach a task or problem and figure out how to solve it."

Indeed, Creative Inquiry is more than an add-on to a few students' education; it's a campus-wide, cross-disciplinary culture of engagement that makes the Clemson experience applied, engaging and extraordinary.

Acknowledgements

Creative Inquiry is supported by:
Provost Doris Helms
Dr. Janice W. Murdoch, Vice-Provost and Dean, Undergraduate Studies
Alumni Foundation
Phil and Mary Bradley

Creative Inquiry program director:
Dr. Barbara J. Speziale, Associate Dean, Undergraduate Studies

Creative Inquiry committee:
Denise M. Anderson, Parks, Recreation and Tourism Management
Beatrice N. Bailey, Teacher Education
Mark J. Charney, Performing Arts
Ulrike A. Heine, School of Architecture
Michael J. Henson, Biological Sciences
Larry F. Hodges, School of Computing
Dana G Irvin, Honors College, Student Services
David K. Knox, Institutional Assessment
Mary Elizabeth Kurz, Industrial Engineering
Suzanne Price, Student Affairs, University Housing
Cynthia L. S. Pury, Psychology
Gail L. Ring, Undergraduate Studies

Focus on Creative Inquiry Planning Team:
Dana G. Irvin, Honors College
Samuel (Tristam) Aldridge, Graduate School
Grace Ammons, Undergraduate Studies
Tullen Burns, Undergraduate Studies

Cover Photo by Dr. John J. Hains
Creative Inquiry team to Dominica to begin Watershed Demonstration Project.
Additional support through Clemson Service Learning.

Schedule of Events

8:00 am - 10:00 am	Students install posters	Hendrix Ballrooms, Meeting Rooms & Multipurpose Room
10:00 am - 12:00 pm	Morning Poster Session	Hendrix Ballrooms, Meeting Rooms & Multipurpose Room
1:00 pm - 2:15 pm	Plenary Session	McKissick Theater

Welcome - Dr. Barbara Speziale

Introduction - Dr. Gerald Sonnenfeld

Featured Speaker - Dr. June Pilcher

Are you Spinning Out?.... Stress and Fatigue in the Work Place and Collegiate Environments

2:30 pm - 4:30 pm	Afternoon Poster Session	Hendrix Ballrooms, Meeting Rooms & Multipurpose Room
4:30 pm - 5:00 pm	Students remove posters	

Speakers

Barbara J. Speziale
Associate Dean, Undergraduate Studies

Dr. Barbara J. Speziale earned her Ph.D. in Zoology from Clemson University, a M.S in Botany at the University of Minnesota and a Bachelor's degree in Biology and in English Literature at the State University of New York at Binghamton. She has served Clemson University in Public Service as well as teaching and administrative roles. She is currently an associate dean in the Office of Undergraduate Studies where she directs the Creative Inquiry program, and a full professor in the Department of Biological Sciences. Dr. Speziale's work in limnology research, science outreach, and science education is funded by more than $12,000,000 in external grants. Her limnology research focused on the impacts of algae in freshwater lakes. Her public service work produced water quality educational materials for South Carolina and national audiences. Her science education activities encourage students, K-12 through college, to pursue science studies and careers. She currently directs two major grants. A project funded by the National Science Foundation recruits and retains first-generation college students in science careers. The SC Life project, funded since 1998 by grants from the Howard Hughes Medical Institute Undergraduate Science Education Program, seeks to improve the life sciences education of South Carolina's K-12 students, their teachers, and undergraduate students at Clemson University and three historically black colleges and universities. She has received numerous awards for her work, including the Elliott Award for Outstanding Service to Off-Campus, Distance and Continuing Education, the South Carolina Governor's Award for Scientific Awareness, Clemson's Martin Luther King Jr. Award for Excellence in Service, the Society for Environmental Toxicology / Menzie-Cura Environmental Education Award, and two awards for the 4H20-Pontoon Classroom curriculum, the Natural Resources Conservation Service Youth Environmental Award and the 4-H Centennial Program of Excellence.

Gerald Sonnenfeld
Vice President for Research

Dr. Gerald Sonnenfeld received his B.S. in Biology in 1970 from the City College of New York and his Ph.D. in Microbiology and Immunology in 1975 from the University of Pittsburgh School of Medicine. He completed postdoctoral training in infectious diseases and immunology at the Stanford University School of Medicine in 1978. He then became an assistant professor of Microbiology and Immunology at the University of Louisville School of Medicine, and rose through the ranks to professor. In 1993, Dr. Sonnenfeld became Director of Research Immunology in the Department of General Surgery Research of Carolinas Medical Center. In 1999, he took up the position of Professor and Chair of the Department of Microbiology, Biochemistry and Immunology and Associate Dean for Basic Sciences and Graduate Studies at Morehouse School of Medicine in Atlanta. Dr. Sonnenfeld next served as Vice President for Research and Professor of Biological Sciences at Binghamton University, State University of New York. In September of 2010, he took up his present position as Vice President for Research and Professor of Biological Sciences at Clemson University. Dr. Sonnenfeld has published over 140 peer-reviewed scientific articles, numerous review articles and edited two books. He holds two US patents. Dr. Sonnenfeld is associate editor of the Journal of Interferon and Cytokine Research, and a member of the editorial board of the Immunological Journal and the Journal of Gravitational Physiology. His research has centered on the effects of stress on the immune system and resistance to infection and cancer. He has also directed multiple pre-clinical studies and been involved in clinical study development for multiple immunoregulatory agents. He has carried out experiments on the US Space Shuttle and on Russian space program satellites.

Plenary Speaker

June Pilcher
Alumni Distinguished Professor of Psychology

Dr. June J. Pilcher earned her Ph.D. in Biopsychology from the University of Chicago. She served as a research psychologist for three years in the US Army at the Walter Reed Army Institute of Research in Washington, DC before beginning her academic career at Bradley University in Peoria, IL. Dr. Pilcher joined the faculty at Clemson in August 2001. She was promoted to full professor in 2005 and was awarded an Alumni Distinguished Professorship in 2009.

Dr. Pilcher's research has been funded for over 13 years by several national agencies including the Federal Railroad Administration and the Center for Advanced Study of Language at the University of Maryland. Her research focuses on the effects of stress and fatigue on performance, health, and well-being in the work place and in college students. Dr. Pilcher works with a team of students to explore how humans can best adapt to the demands of modern society and how we can make better choices in managing our work, sleep, and health-related habits. Dr Pilcher's other interests include teaching and training in a non-competitive, traditional martial art and rescuing ex-racing greyhounds. She has received numerous awards for her research and her work with students, including the Bradley Award for Mentoring in Creative Inquiry and being named as a Fellow in the Association for Psychological Science in 2010. She was most recently awarded a prestigious Fulbright Fellowship, the Fulbright-Freud Scholar Award, for 2011-2012 at the University of Vienna and the Freud Museum in Vienna, Austria.

The Phil and Mary Bradley Award for Mentoring in Creative Inquiry

The Phil and Mary Bradley Award for Mentoring in Creative Inquiry is presented each spring in recognition of outstanding work with undergraduate students. Nominations are accepted from student participants in Creative Inquiry Initiative team projects. The award is made possible by a generous gift from Phil and Mary Bradley, and consists of a plaque and a salary supplement.

Bradley Award Recipients

2010 Dr. June Pilcher, Alumni Distinguished Professor of Psychology
2009 Dr. Karen Kemper, Associate Professor of Public Health Sciences
2008 Dr. Susanna Ashton, Associate Professor of English
2007 Dr. Mark Charney, Professor of Performing Arts

The Bradleys are a "One Clemson" family, supporting both athletics and academics, including providing the first major gift for the Creative Inquiry initiative. They did so because they like the idea of relevance and results. "The projects we've seen so far are about real problems," says Phil, "and they're designed to find solutions."

Phil's father, William F., had attended Clemson in the late 1930s, gone into service before he graduated, gotten married and started a family. In the late 1940s, he came back to Clemson with his young family to finish his degree. Years later, Phil Bradley enrolled in Clemson. After his sophomore year, he married his high school sweetheart, Mary, and before he graduated in 1965, they too had begun their own family with daughter, Renee.

After military service, the Bradleys settled in Charleston where they had their second child, Philip, and where Phil established a successful career in the insurance industry. Their children grew up coming to Clemson ball games. One of Philip's first Death Valley memories is that of being picked up by the Tiger.

Both children attended Clemson. Renee later transferred to the College of Charleston, while Philip earned a political science degree at Clemson in 1992. He now has his own Allstate agency in Mount Pleasant. Seeing Philip graduate was coming full circle for Phil and Mary. In fact, Philip had his father's and grandfather's graduation years engraved inside his own Clemson ring.

The Bradley family has always believed in a life of involvement - whether it's working for their church, hosting Clemson Lowcountry events or giving financial assistance to worthy causes.

"Clemson has played a large role in my family's development," says Philip. "As our own history has evolved, so has the University's. Giving back is part of our shared tradition."

Excerpted from: Clemson World, Summer 2006Volume 59 Number 3: 'One Clemson' Family

Creative Inquiry gratefully acknowledges our Provost, Dr. Doris Helms.
It is her vision and support that have made all of this possible.

Dr. Doris Helms
Vice President for Academic Affairs and Provost

The vice president for academic affairs and provost is the chief academic officer of the university and chairperson of the university faculty. Responsible directly to the president for all academic matters, the provost has administrative jurisdiction over teaching, student admissions, registration, financial aid, graduate studies, research and computing services.

The provost recommends to the president short- and long-range plans for academic development and formulates policies to implement approved plans. The colleges report to the provost, as do units such as the Graduate School, Undergraduate Studies, International Affairs, Research Office, the Library, Computing and Information Technology, and the Office of Effectiveness and Assessment. In the absence of the president, the provost presides over the affairs of the university.

Doris R. "Dori" Helms, Ph.D., was named vice president of academic affairs and provost at Clemson University on Feb. 8, 2002.

Helms is a graduate of Bucknell University and holds a doctorate from the University of Georgia. She joined Clemson University in 1973 as an assistant professor of zoology. She later served as department head and professor of biology, then associate dean of the College of Sciences.

Abstracts

Poster #1

Testing Drug Combinations for Cancer Therapy Research

Faculty Mentor: Frank Alexis, Bioengineering

Students: Thomas Moore, Will Gordon, Robert Lewis, Mike Collier, Scott Mattison, Kevin Keith

Drug combination is a major treatment approach in current cancer therapies. When two drugs are applied in combination to a biological system, their joint effect can be additive, synergistic, or antagonistic relative to one another.

- Additive interaction - the effect of two chemicals is equal to the sum of the effect of the two chemicals taken separately.
- Synergistic interaction - the effect of two chemicals taken together is greater than the sum of their individual effect at the same doses.
- Antagonistic interaction - the effect of two chemicals is less than the sum of the effect of the two drugs taken independently of each other

This project found multiple synergistic drug combination in multiple different cancer cell populations. The value in this research can be seen in that synergistic drug combinations allow for greater tumor toxicity at lower dosages.

Poster #2

Finding a Thirdspace: A Multimedia Exploration of Public Education, Outreach, and Communication at the Johannes Kolb Site

Faculty Mentors: Victor Vitanza, English, Bryan Denham, Communication Studies

Student: Emily Ligon

By combining empirical data and ethnographic evidence, this multimedia presentation will demonstrate how different communication and educational methods utilized during the 2008-2011 public days at the Johannes Kolb site correlate to increases in visitor numbers, repeat visits, and community building. In addition, the presentation will enact new media resources useful for helping the public visualize abstract archaeological concepts in new ways. It will draw on Edward W. Soja's theory to create a new space that seeks to de-stabilize traditional dichotomies regarding historicality and sociality by offering a meeting place for diverse audiences in academic, avocational, and public archaeology. Sponsors include SC Department of Natural Resources and Diachronic Research Foundation.

Poster #3

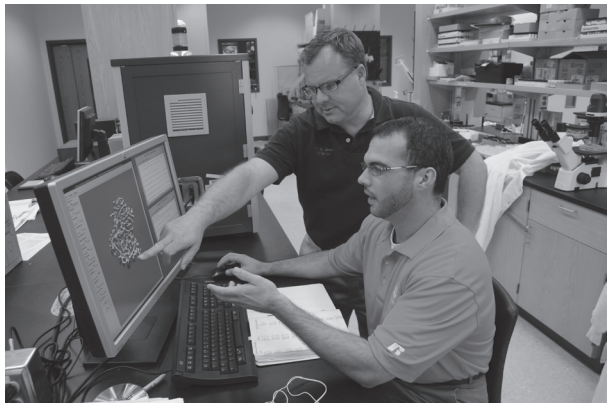
Microhabitat Use of Stream-Dwelling Salamanders Along a Land-Use Gradient

Faculty Mentor: Robert Baldwin, Forestry and Natural Resources

Students: Lucy Love, Zack Fait, Justin Trone, Ross Williams, Travis Knott, Maggie Smith, Victor Garrett, Derek Acker, Caroline Gill, Brianna Noblin, Chris Wilson, Hannah Moore, James Jenkins, Jane Livington, Lauren Beyrent, Robert Hottensen, Thilina Surasinghe

We investigate the microhabitat use of stream-dwelling Northern Dusky (ND) and the Black-bellied (BB) salamanders as a function of riparian land-use activities. We rear our focal species in controlled laboratory conditions (artificial streams), simulating four land-cover types: forested, residential, agricultural and urban. This experiment will be replicated three times, with three phases in each replication, coexistence of both species and species isolation. Observations are made on the aggression behavior and microhabitat occupancy of salamanders. Black-Bellied salamanders mostly occupy rock crevices of the stream banks in all the land-use simulations. The Northern Dusky salamanders occupy many microhabitat types. In the forested stream Northern Dusky salamanders exclusively occupy the stream channel, woody debris, leaf litter, interstitial space among

gravel particles, and do not associate the stream banks. In the other land-use simulations, Northern Dusky salamanders occupy both the stream channel and the bank. Based on these observations, we concluded that our focal species become competitive for microhabitat use with increasing land-use intensity. Further, we concluded that Black Bellied salamanders are highly specific whereas Northern Dusky salamanders are generalists in microhabitat use. The high microhabitat selectively of Black-bellied salamanders becomes a liability when interstitial habitats in the riparian zone get destroyed with siltation and sediment deposition as consequences of land development.



Poster #4

Distributed Video Analytics over Wireless Mesh Networks for Critical Public Safety Applications

Faculty Mentors: Kuang-Ching Wang, Stan Birchfield, Electrical and Computer Engineering

Students: Jeff Heider, Chris Coode, Megan Becvarik, Kenneth Allman, Benjamin Ujcich

Video analytics over wireless mesh networking combines the research of two leading technologies that are in the process of being deployed across Clemson. Video analytics analyzes images using algorithms in software, while wireless mesh networking serves as the physical infrastructure supporting it, among other potential applications. The team serves as a basis for future in-depth research on the NSF's GENI initiative and the OpenFlow network switching protocol. Individual members work on separate but complementing aspects of the project. The broad goals for the semester include implementing OpenFlow in a commercial setting, experimenting with video analytics software to identify cars from camera feeds, researching background information about computer networks and wireless mesh networking, formulating a possible data analysis network for the university using OpenFlow, and developing a prototypical networking curriculum to bring GENI to the high school classroom.

Poster #5

Coping with Interruptions in Computer-Mediated Environments: The Role of Computer Experience

Faculty Mentor: Jason Thatcher, Management

Students: Christopher Stegman, Mathew Russell, Heath Runion, Alexa Parker, Kelley Lutz, Gracie Levine, Nick Hentz, Michelle Faber, Shontavian Devore, Jordan Achterhoff, Stefan Tams

In the workplace, technology can cause stress ("techno-stress"), which can erode the very productivity gains sought by the introduction of the technology. To treat this problem, we must gain a more complete understanding of the factors which cause techno-stress, and of factors which may reduce technology-induced stress. This research-in-progress considers whether computer experience can ameliorate workplace stress caused by technology-mediated interruptions (instant messages, for example). If computer experience is revealed to be a factor in the reduction of techno-stress in this way, inferences may be drawn about the relationships between techno-stress, individual differences, and work conditions. By drawing upon existing research in psychology, we offer the hypotheses that more frequent technology-mediated interruptions cause more techno-stress, and that computer experience moderates those stressful effects. Ultimately, our assertions must be tested through an experiment, which we describe in this paper. This research is generously sponsored by the Clemson University Creative Inquiry Program.

Poster #6
Attractiveness, Attraction, and Feeding Behavior in Dining Pairs
Faculty Mentor: Tom Alley, Psychology
Student: Olivia Fox

Attractiveness may play a role in the food sharing behavior of couples, and may also influence how attracted members of a couple are to each other. To investigate this, 256 mixed-sex dyads were covertly observed while eating in public locations. Trained observers used an observation coding form and recorded information about food sharing behaviors, as well as rating the attractiveness of each person. Afterwards, they completed a brief questionnaire asking about being fed by, and feeding, their dining partner, and about attraction to the other person. As predicted, participants who were rated less attractive than their partners reported being more attracted to them. Additionally, it was found that a more attractive member of a dyad reported being fed by the dining partner more often than a less attractive member, supporting the idea that people may use feeding behaviors to compensate for unequal attractiveness within a relationship.

Poster #7
Fort Hill Education
Faculty Mentor: William Hiott, History
Student: Caroline Alex

Fort Hill is a landmark and timepiece that has left behind a legacy of pride. The stories of those who lived at Fort Hill fill the air, creating a feeling of determination and strength. The plantation was full of many different people throughout its years; the lives of the Calhoun's, Clemson's, and African Americans, from Fort Hill, can enlighten the public about our nation's history. We found that Fort Hill is lacking educational supplements for its educator audiences. Research is being conducted about the African American lives at Fort Hill through original documents. At Fort Hill, we are working on a lesson plan for the high school age that will allow students to learn about the everyday life of African Americans on the plantation by interpreting and analyzing photographs, original documents, and accounts. This lesson plan will bring Fort Hill to life. Sponsored by Will Hiott, curator of Fort Hill

Poster #8
The Children of Fort Hill
Faculty Mentor: Will Hiott, History
Students: Robert Wolfe, Mary Koziar, Rose Senn

The main purpose of this creative inquiry is to examine the lives of John C. Calhoun's children in order to better understand the family of Calhoun and as an examination of life on the plantation during John C. Calhoun's life. Although the Calhoun children are not the most famous people who lived in Fort Hill, they are important to understanding the daily life at Fort Hill. People often like to visit historic sites to imagine what it was like to live a time period different from their own. Providing information on everyday family life allows people to better connect with the lifestyle of the era. Fort Hill in its current state focuses mainly on the political life of Calhoun and the founding of Clemson University. While these are the most important to Clemson University it is always helpful to include more information about the family.

Poster #9
Structural Health Monitoring of Large-scale Civil Infrastructure
Faculty Mentor: Sezer Atamturktur, Civil Engineering
Students: Jordan Supler, Andrew Phifer, Mary Rutlan, Saurabh Prabhu

The goal of this creative inquiry project is to fully develop long-term, continuous structural health monitoring techniques for large-scale civil infrastructure. Structural health monitoring techniques have the potential to track the structural degradation of infrastructure systems over time and provide valuable data pertaining to the overall 'health' of a structure. This project focuses on monitoring the Cathedral Church of St. John the Divine, a large-scale masonry cathedral in New York City. A finite element (FE) model of the cathedral nave is developed to simulate the behavior of the structure, while on-site vibration tests are performed to calibrate the FE model. The calibration process involves adjusting FE model input parameters, so the FE model output closely matches the experimental data collected from the structure. The calibrated FE model can help predict structural behavior under future loading and aid in determining a 'prognosis' for the a structure's remaining service life. Funding was provided by the Clemson Office of Undergraduate Studies and the National Center for Preservation Technology and Training (NCPTT).

Poster #10
Lethality of Sous-Vide Pasteurized Product

Faculty Mentor: Felix Barron, Food Science and Human Nutrition
Student: Matthew Eisenstat

Many bacteria can contribute to food-borne illnesses from pork products. Members of the genus *Clostridium* are of particular interest in both medical and food sterilization due to their ability to form endospores. The sous-vide cooking process involves cooking a vacuum sealed food product at relatively low temperatures in a water bath for long periods of time. Due to low temperatures and short preparation time, the sous-vide method has come under scrutiny by the FDA. Every sous-vide process must be verified to ensure that bacteria such as *Clostridium* could not potentially infect consumers. In order to do so, the cooking process was replicated in the laboratory. Thermal sensors were placed in the meat from during the experiment in order to quantitatively measure the lethality of the cooking process and predict the thermal death time of pathogens. This project combined the efforts of the Food Science and Microbiology departments.

Poster #11
Probiotic Foods and Potential Health Benefits
Faculty Mentor: Dr. Felix Barron, Muthu Poruthotage, Food Science and Human Nutrition
Students: Robert Newhouse, Stephen Scott, Michelle El-Khawaja, Sam Michael, Lauren Goss

Probiotics are beneficial bacteria that are claimed to boost the immune system and aid digestion. They have gained popularity as "health" foods and dietary supplements. The team goal is to determine the viability and survival of a most important probiotic in a designed probiotic food. A mixture of coconut water and oatmeal is a potential non-dairy product that lactose-intolerant consumers can digest. The prebiotic inulin was added to enhance the growth of *Lactobacillus plantarum 299v*, selected as the probiotic because it is well-suited to surviving the human digestive tract. Standard microbiological methods were used to determine the number of living probiotics. The optimal storage temperature was determined to be 4°C, and the effects of inulin appear to actually enhance growth. These results will help the discovery of important factors essential to delivering the proposed health benefits from probiotic foods.

Poster #12
Clemson Engineers for Developing Countries
Faculty Mentor: Lansford Bell, Civil Engineering
Student: Lucy Barksdale

A group of Clemson students (primarily engineering students) partnered with The Episcopal Diocese of South Carolina in an effort to provide clean drinking water for the people of Cange, Haiti. The group is a collection of engineering students who are eager to put the technical skills they have learned at Clemson to provide a design for a drinking water system to be built in Haiti. Although the designs are not fully completed, students have had a chance to visit Cange and see that progress that has been made. The students participating in the organization have an opportunity to sharpen communication, marketing, and technical skills while gaining cultural awareness. Clemson Engineers for Developing Countries provides students with a chance to experience how projects are done in third world countries, a rare but valuable opportunity.

Poster #13
An Experimental Demonstration of *Prunus persica L.* 'Guardian' seed stratification treatment effect on Radical Protrusion, Emergence, and Seedling Vigor
Faculty Mentor: Douglas Bielenberg, Horticulture
Student: Grady Reed

Seeds have an endodormancy requirement such that extended periods of cold temperatures and moisture overcome this innate dormancy to germinate. In this study, various growth responses were measured in order to determine true chilling requirement of the seed. Groups of seeds were subjected to cold treatments according to a full factorial experimental design of 9 chill hours with 20 repeated measures. Growth responses measured were radical protrusion, radical vigor, emergence and initial growth rate. Seedling emergence and vigor were optimal with 1008 hours stratification, while germination was maximized at 1167 hours, and radical vigor at 840hours. This study demonstrated the range for overall chilling requirement in an important commercial peach rootstock, *Prunus persica L.* 'Guardian'. Acknowledgment: Dr. Douglas Bielenberg

Poster #14
Determining the Underlying Bedrock from Soil Sampling
Faculty Mentor: Scott Brame, Environmental Engineering and Earth Science
Student: Adam Thompson

A student research team at Clemson has been analyzing bedrock samples to create a geologic map of the Clemson Forest. A major limitation faced is that sample collection is dependent upon rock exposures. A soil analysis has been proposed to determine bedrock in areas without outcrops. Soil samples were collected from sites immediately adjacent to previously mapped exposures of the two rock types. The collection process consisted of coring and collecting soil samples in half foot increments. Representative samples were used to produce grain-mounts, allowing a mineralogical analysis by use of a polarized microscope. An x-ray diffractometer was also used to detect mineralogical composition. It is anticipated that the main differences will be the types of weathered minerals present in the sample. The ultimate goal is to combine these findings and develop a methodology of quickly analyzing soil samples in the field and extending the mapping into areas lacking outcrops. A special thanks to Scott Brame for guiding me during my project.

Poster #15

Macro Atomic Force Microscopy

Faculty Mentors: Vladimir Reukov, Gary Thompson, Bioengineering
Students: Mitchell Fullerton, Will Sumner, Victor DePiero

An atomic force microscope tracks forces of a cantilever over a surface using a laser to create an image of the surface that is microns in size and nanometers in resolution. Have we lost you yet? Thought so. Our goal in this CI is to take the abstract ideas behind AFM and enlarge them into the realm of physical sight. As an outreach to future Bioengineers we created this lego AFM to illustrate the process of microscopy. Our goal is to create a working model that fully demonstrates the capabilities of an Atomic Force Microscope and make the concept open to their level of learning. Ideally in creating an aesthetic and user friendly visual this project will open viewers minds to the field of bioengineering and its prospects. This project was funded by the Clemson University SC Life program, with support from the Howard Hughes Medical Institute.

Poster #16

The Effects of Performing a Mental Task on Levels of Mental, Emotional, and Physical Energy

Faculty Mentor: Thomas Britt, Psychology
Students: Emily Stein, Cassie Walker, Christie Kelley, Michael Muthleb, Gordon Hodge

The present study examined changes in mental, emotional, and physical energy after performing a mental task of different lengths. 118 participants were asked to fill out a pretest evaluating their state mental, physical, and emotional energy as well as other personality measures. A practice SAT packet was given to each participant and they worked on these packets for either 25 minutes or 50 minutes. Results revealed that reports of mental energy dropped in both the 25 and 50 minute conditions. Emotional energy also dropped, but the difference in pre and post energy was not as large. Physical energy did not change from pre to post-test. Results also revealed that participants who scored high on the personality trait of work motivation intensity experienced a large drop in mental energy compared to those who scored low on the train. The results provide support for the state mental energy scale."

Poster #17

Psychological Energy as a Resource for Accomplishing Physical, Mental, and Emotional Tasks

Faculty Mentor: Thomas Britt, Psychology
Students: Hannah Peach, Michael Muthleb, Eric McKibben, Anna McFadden, Ashlee Baker
A new measure to assess perceived energy available to accomplish physical, mental, and emotional tasks was evaluated. Participants included 174 students who completed the survey either online (N=93) or by paper and pencil (N=81). Participants completed measures of the energy they generally have to perform physical, mental, and emotional tasks, vigor, vitality, positive and negative affect, and self-reported indexes of hours of exercise per week and SAT score. The three subscales were reliable and were not significantly correlated with each other, but were moderately related to other established measures of energy. Additionally, mental energy was found to be positively related to SAT scores and physical energy was positively related to exercise hours per week.

Poster #18

The Effect of Physical Exertion on Levels of Physical, Mental, and Emotional Energy

Faculty Mentor: Thomas Britt, Psychology

Students: Rebecca Wiener, Daniel Mack, Ashlee Baker, Anna McFadden, Tierney Evans

The current study examined the validity of a new measure of state physical, mental, and emotional energy by assessing whether reports of energy changed after performing an easy or demanding physical task. Participants were college students (N = 26) who completed the state measure of energy before the study began, along with personality measures. Participants then walked up and down either 1 or 10 flights of stairs, reporting their physical tiredness and perceived tank levels of the three energy subtypes after each flight. The participants then completed a final state energy measure. Results indicated a 2 (1 vs. 10 flights) x 2 (pre vs. post-test) interaction on state physical energy, showing no pre-post difference when participants walked 1 flight of stairs, but a strong difference when they walked 10 flights. This interaction also occurred for mental and emotional energy, suggesting that an intense physical exercise depleted energy in multiple domains.

Poster #19

Examining the Predictive Validity of a New Measure of Trait Physical, Mental, and Emotional Energy

Faculty Mentor: Thomas Britt, Psychology

Students: Rebecca Weiner, Emily Stein, Danielle Leach, Tierney Evans, Christie Kelley, Cassie Walker, Michael Muthleb

The purpose of this study was to determine if our trait measure of physical, mental, and emotional energy would predict the amount of energy individuals reported throughout the course of a week, as well as how much stress they experienced. Based on Hobfoll's conservation of resource theory, we hypothesized that higher trait energy results in greater energy resources, resulting in lower stress. On Monday, participants completed our trait energy measure, a number of previously validated measures, and were given a Palm Pilot on which they completed energy and stress measures at set time intervals three times a day until Friday. Results provided support for the predictive validity of our trait energy measure, as trait mental energy predicted average state mental energy, trait emotional energy predicted average state emotional energy, and trait physical energy predicted average state physical energy. Additionally, trait physical energy predicted lower stress during the week.

Poster #20

Organized Crime in Film

Faculty Mentor: Marjie Britz, Sociology

Student: Jason Crews

This Creative Inquiry group was established to analyze how organized crime is portrayed in film. Well-known mobster movies portraying Italian, African-American, Hispanic, Irish and Russian organized crime groups were watched. After every film (and for *The Sopranos* every season) the group analyzed what they watched, focusing on character evolution, how accurately the film portrays organized crime, and relationships the main characters have with others. How often the films accurately portrayed organized crime was mixed, some accurately portraying it and others using stereotypes and myths. The group also found that films generally attempt to show gangsters as Robin Hood type figures, rather than as the vicious criminals they are.

Poster #21

Examining Three Designs of a Robotic Nightstand

Faculty Mentor: Johnell Brooks, Psychology

Students: Carson Carroll, Katie Kendrick, Kylie Sprogis, Mary Mossey

This study aimed to explore the desired and needed characteristics of an automated nightstand. Creating a user-centered nightstand could potentially aid individuals aging in place with minimal care or assistance by fulfilling user needs as well as the user's wants. Three cardboard nightstand prototypes were created with the help of architects and engineers. Older adults, university students, current hospital patients, and hospital employees were interviewed to examine what features they liked or disliked about the three prototypes. Participants were asked to choose their preferred feature from the three nightstands as well as rate how much they liked each feature on a five point Likert scale. User needs and preferences are important to understand for creating a nightstand that can aid future generations in aging comfortably in their own home.

Poster #22

The Clemson University Retrieval of Explants Program in Orthopaedics

Faculty Mentor: John Desjardins, Bioengineering

Students: Virginia King, Hannah Cash, Riley Csernica, Amber Justice, Kevin Keith, Ariel Nissan, Estefania Alverez

Every year nearly 1 million patients receive total joint replacements to relieve arthritis pain and restore joint function in the hip or knee. Within 15 years it is predicted that this clinical procedure will increase as much as 675%, as our population ages. These implants are not perfect however, and sometimes they are removed (or "explanted") because of infection, loosening, damage or wear. Rather than throwing these used devices away, member of this Creative Inquiry Team, have started a state-wide program, known as CU-REPO (Clemson University Retrieval of Explants Program in Orthopedics) to learn more about why implants fail, how they work, and how we can make them last longer. This team of undergraduates collaborates with hospitals and surgeons from around the state and nation. They collect, clean, catalog and study explanted total joint replacements to make them better for all of us. It's a JOINT EFFORT.

Poster #23

Interpreting Fort Hill Through Effective Signage

Faculty Mentor: Will Hiott, History

Students: Jason Cassell, Austin Barrett, Ethan Gray

Signage is particularly important for interpreting sites of historical and cultural importance. Signs serve as an avenue for visitors to develop a front-line orientation of what the site is and why it is of interest. We have found that signage at Fort Hill is lacking. An interpretive sign at Fort Hill would allow visitors and casual observers to read a concise overview of Fort Hill and its importance to the University as well as the country. Our research team has decided to place an interpretive sign in the high foot-traffic area between Fort Hill and the Trustee House. Inquiry will be made into the interpretive signage research literature to direct the development of this new fixture. Signage at other local historical sites will be studied to give further direction to this project. The final product will be an interpretive sign that communicates the significance of this often-overlooked historical site.

Poster #24

Clemson University Biofuels Initiative

Faculty Mentors: Terry Walker, David Thornton, Biosystems Engineering

Students: Siva Shwetha, Karris Rolan, Kaitlyn Murray, Jovan Popovick, Laura Burton, Allison Rue, Dexter Pearson, Cynthia Westmoreland, Kirby Tate, Kiah Baker, Holly Garrett

How can we meet all of our transportation fuel needs from sustainable renewable sources on Clemson University campus? The obvious answer is to lower consumption! To assist this effort, our engineers from Environmental, Biological Systems, and Chemical Engineering have combined to form the Clemson Sustainable Biofuels Initiative. Students begin their understanding of biofuels production producing first generation biodiesel by collecting campus waste cooking oil, preparing it for the transesterification reaction, and converting this oil into ASTM quality biodiesel for our campus fleet using careful analytics and our amazing new off-grid mobile biodiesel production facility. Experience with this process and equipment serves as the launchpad for new research to be done on second and third generation biofuels such as algae oils, cellulosic ethanol, and Fischer-Tropsch technologies.

Poster #25

Can Driving Simulators be a Useful Tool to Teach Adults with Intellectual Disabilities to Drive?

Faculty Mentor: Sharon Sanders, Teacher Education

Students: Angie Yates, Gabi Thrift, Kathryn Powell, Stephan Piontek, Rebecca Moseley, Taylor Morison, Mary Elaine Mahaffey, Lara Haynie, Rachael Hardin, Megan Collins, James Collins, Mary Mossey

In order to investigate the effectiveness of driving simulators to teach this adults with intellectual disabilities driving skills, four participants practiced their driving skills for one hour, five days a week. Drivers started on a straight road to allow time to adjust to the simulator and practice key principles of maintaining lane and speed control. Once the drivers were comfortable on both a straight and curvy road, they practiced speed control and maintaining lane on several "training tracks" which increase in length and complexity. After completing each track, drivers were given feedback regarding number of left and right line touches and average speed. Drivers must meet certain competencies, maximum of one line touch on the left and right side, and an average speed within five miles per hour of the instructed speed, before moving to the subsequent track. They had to execute these requirements in two of three trials before progressing.

Poster #26

Teacher's Workstation Redefined

Faculty Mentors: Kenneth Weaver, Barbara Weaver, Chuck Heck, School of Computing

Students: Caleb McCarthy, Scott Weiner, Danny Mecca, Jacob Wood, Ar'Tashia Johnson, Zachary Hance

Technology changes daily. As a result of this daily change, teacher's lecterns are far behind in terms of new technologies in many of the classrooms at Clemson University. We were tasked this semester in creating a lectern following universal design that would accommodate all teaching styles with ease. Important focuses used during the design were the shape and size with easily-altered height, all various types of video and audio input and output, and a maneuverable display suitable for writing and viewing. We had no budget and no limitations during implementation. Each student involved brought different backgrounds from computer science, architecture, ceramic engineering, industrial engineering, and mechanical engineering. With the fast rate of changing technology, our design had to allow for easy improvements in the future.

Poster #27
Flow Theory Implemented in an American Literature Classroom
Faculty Mentor: Bea Bailey, Teacher Education
Students: Catherine Manci, Drew Brittian, Kaitlynn Wright

What happens when Mihály Csíkszentmihályi's *Theory of Flow* is introduced into high school American Literature classrooms? Three secondary education English majors have taken the practical applications of Flow Theory by Peter Smaorinsky, combined them with the idea of creative enterprises by Smith and Wilheim, and introduced them to their American Literature classrooms. These lessons ask students to gain control and competence, to experience the social, to focus on the immediate experience, to work at an appropriate challenge, and to establish clear goals while receiving immediate feedback. Each of these aspects of Flow Theory has been included in each lesson plan, and currently we are researching whether students will get into a flow of learning by adding these five basic principles. We predict that if students are able to get into a state of flow, classes will experience deep and meaningful learning instead of short-term memorization. Dr. Bea Bailey has led our efforts to introduce Flow Theory into our classrooms.

Poster #28
Modernizing Shakespeare: Encouraging "Flow"
Faculty Mentor: Bea Bailey, Teacher Education
Students: Ashley Bowman, Carolina Compton, Cassidy Barnett, Sara Touchet, Angela Sinisgalli

As teacher candidates in English education, we investigated the effects of teaching Shakespeare's plays in engaging ways as we addressed this question: In what ways do constructivist teaching methods encourage engagement or "flow?" "Flow" refers to a state in which students are so focused on their work that they are not distracted, even by friends or outside-of-school hobbies (Smith and Wilhelm, 2006). We have designed constructivist projects for teens such as creating *Facebook* pages for Shakespearean characters, developing modern adaptations of Shakespearean plays, and hosting mock talk shows based on conflicts within these plays. It will be determined if the conditions for flow were in place and supportive through participant observations and analysis of student artifacts. Our goal is to help students construct texts or performances within "engaging literary enterprises" (Bailey and Kerns, 2011) so that they can perform in accord with English course standards in fun and creative ways.

Poster #29
Metabolic Syndrome and Hispanic Children: A Case Study
Faculty Mentor: Felix Barron, Food Science and Human Nutrition
Students: Lashonda Douglas, Joshua Visserman, Luke Shelton

Metabolic Syndrome is a compilation of factors that collectively cause an increased risk of stroke, heart disease, and diabetes. The goal of this study was to explore associations between food intake, physical activity, and BMI of overweight and non-overweight Hispanic children. Using a 24-hour diet recall form, data were collected from 30 children. BMI, age, and activity levels were collected using physician's charts. "Genesis" software was used to determine nutritional information for each child's recalled daily food intake. The data were compared to the recommended daily intake for each child according to age and gender. Our results indicate a significant portion of the children were overweight or obese. Initial review shows some correlation between food intake amounts and BMI and also activity level and BMI. Our data analysis is currently ongoing. The results and nutritional information for each child were sent back to their physician for review and consultation.

Poster #30

Comparing the Eeffectiveness and Acceptability of the Jump Into Foods and Fitness (JIFF) and Quest for Health Nutrition Interventions within an African-American Population

Faculty Mentors: Beth Kunkel, Food Science and Human Nutrition, Veronica Parker, Nursing
Student: Jermaine Shaw

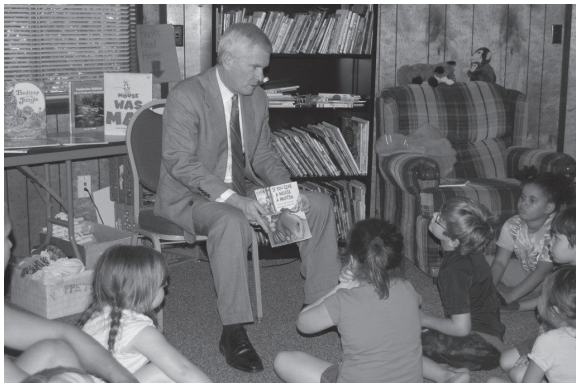
Minority groups continue to be disproportionately affected by Cardiovascular Disease and Type II Diabetes. The purpose of this study was to examine the effectiveness and acceptability of two nutrition education programs in an adolescent African-American population. One group at the Sumter County Boys and Girls Club was taught three lessons from Jump into Foods and Fitness, and the other group was taught three lessons from Quest for Health. Both groups completed their curriculum's pre- and post-test survey tools and also participated in a focus group discussion at the conclusion. Results showed that both curricula were effective in teaching nutrition concepts based on the increases in post-test scores. These students also had strong opinions about the content and delivery of these curricula. Studies like this are needed in order to ensure that the interests of minority populations affected by disease at higher rates are included in curriculum design.

Poster #31

Strategies to Involve Nutrition Undergraduate Students in the Development and implementation of a One-Day Nutritional Intervention for Preschool Age Children in KidStuff Academy

Faculty Mentors: Katherine Cason, Maciel Rossi, Maria Mercedes, Food Science and Human Nutrition
Students: Amy Silver, Kevin Johnson, Martha Green, Margaret Caulder, Kayla Dickson, Courtney Hensch, Sterling Capotosti, Maciel Ugalde

Childhood obesity is the result of few calories expended for the amount of calories consumed. This is mediated by behavioral and environmental factors. Children spend much of their time in Daycare centers, making them ideal places to develop innovative interventions to prevent childhood obesity. The aim of this project is to involve undergraduate students in the design and implementation of a one-day intervention to encourage preschool children to eat more fruits and vegetables and to increase physical activity. The behavior capabilities targeted on the one-day experience were to identify different fruits and vegetables and their importance and to increase physical activity through hands-on activities. The "Go, Slow, WHOA" method was used to provide the knowledge to the children. As a result the intervention was designed and successfully implemented giving the students experience for future projects that might help change children lifestyles.



Poster #32

Creative Inquiry Involvement in the Development and Testing of EFNEP Youth Quest Impact Assessment Tool

Faculty Mentors: Katherine Cason, Yenory Hernandez-Garbanzo, Maria Catalina Aragon, Food Science and Human Nutrition
Students: Susan Elaine Mathews, Tessa Brinkman, Hannah Clark, Melissa Ikerd, Kathryn Lybrand, Laura Johnson, Amelia Gannon, Victoria Hayden, Ginger Thomas, Trisha Hall

In order to enhance the current evaluation methods of the youth Expanded Food and Nutrition Education Program (EFNEP), the goal of this research project was to develop an impact evaluation tool, with psychosocial measures that might

be modified by youth EFNEP interventions. Through the creative inquiry experience, students were actively involved in the conceptualization, construction, pilot-testing and psychometric testing of the questionnaire. The questionnaire was tested with a sample of ethnically diverse children from low-income schools throughout South Carolina (n=452). Currently, data collection results are being analyzed using SPSS and Mplus. Future steps include to report at the state and national level the questionnaire's factor structure, reliability and validity. As conclusion, joint efforts between creative inquiry undergraduate students, graduate students and an advisory panel was fundamental to achieve each of the steps that include the development and testing of a measurement tool for the evaluation of Youth EFNEP. Acknowledge: Clemson University Creative Inquiry Initiative.

Poster #33

Anthropometric Workshop for Pre-School Age Teachers: Designing and Testing

Faculty Mentors: Katherine L. Cason, Maria Mercedes Rossi, M. Catalina Aragon, Food Science and Human Nutrition
Students: Taylor Corley, Andrew Karst, Courtney Dunn, Caroline Halliday, Julia Scheider, Alison Squiller

SHARE Head Start is a national program that promotes school readiness by enhancing the development of low-income children through the provision of education, health, nutrition and social services. Twice a year, children are weighed, heighted and then plotted on a standardized growth chart. Common errors were found that could have a negative impact on the children's health status. In order to analyze and report children's growing patterns properly is imperative to have accurate measurements. To improve the accuracy of these measures, the CI team designed and pilot tested an Anthropometry Workshop Training (AWT). Eight centers were selected to implement the AWT and its assessment. Afterward, the team conducted an outcome evaluation, a process evaluation and an observational check list. A pre-posttest was completed to assess knowledge and self-efficacy; and focus groups were conducted to evaluate teacher's outlook. The results will indicate whether the AWT is effective or requires further modifications.

Poster #34

The Influence of Salinity Variation on Juvenile Blue Crab Growth and Survival

Faculty Mentor: Michael Childress, Biological Sciences
Student: Anna Gurley

In South Carolina, blue crab landings have decreased more than 30% since 1998 due to severe drought. Previous studies have suggested blue crabs have highest survival and growth at intermediate salinity. In this study, we collected crabs from the ACE Basin and housed them in aquaria at one of three salinities, 5, 20 & 35 ppt. Molting and mortality were recorded daily for 120 days at a temperature of 20°C. Growth was measured before and after each molt in both carapace width (mm) and wet weight (g). Crabs at different salinities had similar growth curves, but crabs at different salinities had significantly different survival curves based on a Kaplan-Meier survival analysis. Crab survival was highest at 20 ppt, intermediate at 35 ppt and lowest at 5 ppt. The shape of the survival curve suggests a period of acclimation during the first 30 days of exposure after which the rate of survival became similar for all treatments.

Poster #35
Alzheimers Literacy in College Students
Faculty Mentors: Elizabeth Chismark, Nancy Meehan, Nursing
Students: Caroline Hallen, Jill Yandle

There is a general public knowledge deficit regarding Alzheimer's disease, risk factors, and potential treatments. This study is to identify the public's general knowledge of Alzheimer's disease and their willingness to try a potential vaccine. With the growing elderly population, nurses are going to be forced to answer more questions and care for future Alzheimer's patients. To better treat our patients, it is important to study and understand gaps in the public's knowledge. A survey, which consists of a vignette and subsequent questions, will be given via surveymonkey.com to fellow college students to gain an understanding of their base knowledge, perceived risks of AD, and willingness to try a potential vaccine. Results pending.

Poster #36
Faunal Description of the Buckrange Sand (Ozan Formation) from Southwestern Arkansas
Faculty Mentors: David Cicimurri, John Wagner, Environmental Engineering and Earth Science
Student: David Lee

What does the distribution of fossils tell us about the environment in which they were deposited? The Buckrange is a sand layer occurring in Southwest Arkansas, and its fossil distribution shows many environmental changes during the late Cretaceous Period of Geologic time (83.5-70.6 Ma). Many fossil samples were collected from different depths within the layer, screen-washed to remove the clay, and sorted by species. I found shell fragments, shark and ray teeth and fish fossils. Because of the grain size and fossils found, the Buckrange sand was likely deposited in less than 10 meters of water. In general, the grain size increases near the top of the member. There are also more vertebrate fossils near the top of the sand member, and more invertebrate fossils near the bottom. The Buckrange shows the relationship between fossils and depositional environments. This project was sponsored by the Clemson University Office of Undergraduate Studies.

Poster #37
Formulation of a Freezer-Stable Southern Peach Dessert
Faculty Mentor: Aubrey Coffee, Food Science and Human Nutrition
Students: Marguerite Dunn, Lacey Thomas, Donald Gaal, Adam Rubelman

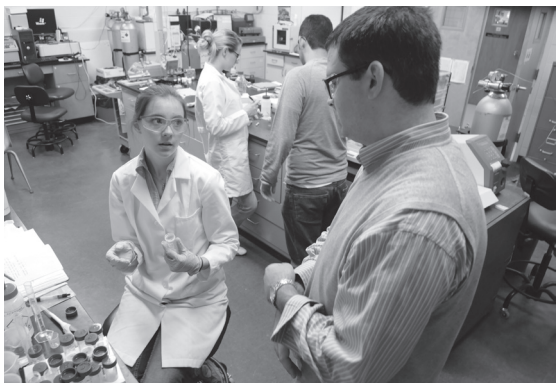
The goal of this creative inquiry was to develop a freezer-stable Southern dessert featuring peaches to be mass-produced for a family style restaurant. The team began with standard recipes and progressed through a series of modifications to make the recipes unique and suited to the project goal. The gold standard product was a peach chiffon cake filled with a mousseline containing dehydrated peach pieces and garnished with a peach-cranberry compote accentuated with fresh lemon flavors. A natural peach flavoring was added to the cake to accentuate the peach flavor from the compote topping. Dehydrated peach chunks were added to the mousseline recipe to impart bursts of peach flavor and a textural difference within the product. The team experimented with various modified food starches and gums in the mousseline in order to attain an acceptable frozen product. The cake was found to have freeze-thaw stability without the addition of functional ingredients.

Poster #38

Educating Children in How to Choose and Prepare Nutritious Foods

Faculty Mentor: Marge Condrasky, Food Science and Human Nutrition

Students: Mary-Elizabeth Tanner, Sarah Boyd, Lauren King, Emily Dennehy, Chelsea Graham, Michelle Lapp, Rebekah Clogston, Abigail Davis, Katherine Ancona, Amanda Ancona



Our project goals are to redesign classic children's foods to be more nutritious, and to educate and encourage children to make healthy food choices. We made healthy eating fun and appealing through teaching children at hands-on workshops how to make our nutritionally improved recipes. Four conventional children's food items were chosen and recreated according to nutritional criteria developed for the project. The recipes were evaluated for appearance, taste, texture, temperature, and overall acceptability after every testing. Thirty to forty children at a local elementary school evaluated the final product. Overall, the recipes were positively accepted, 80-87% acceptance (p-value >0.05). The final recipes were taught to a group of children at the Greenville Children's Museum. Our research works toward alleviating childhood obesity by creating tasty recipes that are lower in calories and fat, and by educating children so that they know how to choose and prepare healthier food options.

Poster #39

Technology Adoption Behaviors in a First Year Engineering Classroom

Faculty Mentor: Lisa Benson, Engineering and Science Education

Students: Catherine McGough, Sarah Grigg

Our research group introduced students in a first year engineering course to a tablet PC software application, MuseInk, and is examining their technology adoption behaviors. MuseInk emulates pen and paper, but records student's work in digital form. This could allow instructors to see not only the final form of a student's work but also the struggles and the processes throughout the problem. The students were surveyed on their attitudes toward the use of the new technology. Like all new technology, there is some resistance, so we are working on ways to help students adopt the use of tablet computers and MuseInk. This involves making tutorials, support documentation, and classroom activities that show how to use MuseInk within various instructional scenarios. We have added functionality to MuseInk to answer our research questions and develop MuseInk as a valuable instructional tool. This is all done thanks to the NSF Award # EEC-1048325.

Poster #40

Becoming a Sexpert: Promoting Sexual Health and Responsibility

Faculty Mentors: Kristin Goodenow, HEHD, Jennifer Goree, Redfern Health Center

Students: Maja Myszkowski, Adrienne Evans

Diseases related to sexual health and responsibility account for one of the fastest growing public health crisis (www.cdc.gov). With 19 million new cases of STDs reported each year in the US and a 50% infection rate for sexually active individuals, the need for comprehensive sexual education is evident (www.cdc.gov). With the current SC public school sexual education legislation, the majority of incoming college students have never been exposed to accurate information about sexual health.

This Creative Inquiry team partnered with Healthy Campus and the College of HEHD to create a fun and interactive program to address sexual health and responsibility. Four unique program templates were created and student volunteers (Sexperts) were recruited and trained to present this information. Programs and publicity events were implemented across campus through Greek Life, University Housing, and Healthy Campus events and publications because every college student deserves to understand sexual health and responsibility.

Poster #41
Forecasting and Scheduling Allocation of Resources in the Feeder Line
Faculty Mentor: Anand Gramopadhye, Industrial Engineering
Students: Matthew Teodori, Davie Markert, Brett Hicks, Ryan Cowherd, Melissa Zelaya

In partnership with Boeing Charleston, this capstone design project focused on an area of the manufacturing setting called the Feeder Line. The Feeder Line's work load is based upon engineering changes that are not consistent in either the volume or the timing; therefore, forecasting for manpower and other resources becomes difficult. The objective was to design a tool that is able to take the independent demand initiated by engineering changes and create a flexible schedule for both baseline and emergent jobs. After determining customer needs and product specifications, the team developed a rudimentary Excel based VBA tool that optimized the scheduled based upon the client's preferred scheduling logic. Two rounds of usability testing were conducted with the client to improve and refine the tool. This tool reduced the time to schedule jobs, allocate jobs to mechanics and improved the flexibility to add new jobs to the schedule

Poster #42
FLASH: Feeder Line Area Scheduling Heuristic
Faculty Mentor: Anand Gramopadhye, Industrial Engineering
Students: Sean Whetsel, Jainee Patel, Bhavik Patel, Edwin Good, Melissa Zelaya

In partnership with Boeing Charleston, this capstone design project focused on an area of the manufacturing setting called the Feeder Line. The Feeder Line's work load is based upon engineering changes that are not consistent in either the volume or the timing; therefore, forecasting for manpower and other resources becomes difficult. The objective was to design a tool that is able to take the independent demand initiated by engineering changes and create a flexible schedule for both baseline and emergent jobs. After determining customer needs and product specifications, the team developed a rudimentary Excel based VBA tool that optimized the scheduled based upon the client's preferred scheduling logic. Two rounds of usability testing were conducted to improve and refine the tool, named Feeder Line Area Scheduling Heuristic (FLASH). FLASH reduced the time to schedule jobs, allocate jobs to mechanics and improved the flexibility to add new jobs to the schedule.

Poster #43
Performance Differences on a Symbol Digit Matching Exercise within a Virtual Environment
Faculty Mentor: Larry Hodges, School of Computing
Student: Adam Fogle

The ability to identify demographic data of individuals who are online in a non-invasive manner has applications in a wide range of fields. One of the most basic demographics to try to infer is gender. We gathered data from participants completing a symbol to digit matching experiment within the virtual environment Second Life. We then analyzed their data, looking for significant difference between genders in measures of performance, such as total correct and time between answers, before

giving the data to Weka (Waikato Environment for Knowledge Analysis) which was then trained to tell male participants from female participants based upon an individual's performance. We also collected computer usage and familiarity data from each participant to ensure these factors did not influence results. Initial results have not shown significant difference between male and females but we are conducting further inquiry.

Poster #44
Uncommon Ingredients in a Familiar Form
Faculty Mentor: Marge Condrasky, Food Science & Human Nutrition
Students: Lyndsay Shackelford, Cory Kohler, Samantha King, Zac Hopkins, Samantha Berube, Chad Carter Anderson Bouton

The goal of this CI project was to produce a healthy snack item. Product development focused on a granola bar using relatively unknown ingredients: maya nut, sacha inchi, and hempseed. These underutilized ingredients feature complimentary amino acids, crude fiber, and an optimal ratio of omega 3 and 6 fatty acids. Besides its health benefits, the bar supports sustainable economic stability and environmental awareness of the ingredients origins. Incorporating these ingredients into a familiar product eases consumer uncertainty and hastens future application. Nutrient content and shelf life determination are planned using laboratory equipment and ingredient profiling. Pilot sensory data were used to evaluate and improve the product. Every production trial was recorded using careful measurements that allow for simple replication. Each week the recipe was altered to obtain a desired quality as guided by the surveys. This unique, nutritious product offers uncommon ingredients that benefit the consumers, producers, and suppliers.

Poster #45
Summary of Federal Trade Commission Labeling Requirement for Environmental Claims on Packages
Faculty Mentor: Kay Cooksey, Packaging Science
Students: Dallas Fletcher, Eric Haas

The Federal Trade Commission recently issued standards for environmental claims commonly used on packaging. The purpose of the standards was to prevent "greenwashing", which is "making unfounded claims of environmental impact of product or package". Examples of standards were researched through literature and issues such as penalties and industry opinion of the standards were studied. This study provided a better understanding of the label standards the package designers must be aware of when developing marketing and visual design of the package.

Poster #46
Fabrication of a Gelatin Scaffold for Use in a Functional Tissue Engineered Heart Valve
Faculty Mentors: Dan Simionescu, Bioengineering, Jiro Nagatomi, Bioengineering
Students: Shelley Floyd, Kenneth Leaphart, Evelyn Patrick, Brendan Roach, Laila Roudsari

The focus of our project is to create living tissue engineered heart valves (TEHV) that will surpass the longevity of current artificial heart valves. We hypothesize that the combination of three elements is essential to the development of functional TEHV: geometry, scaffolds, and cells. To test our hypothesis, we prepared a bioresorbable polymer mesh-reinforced gelatin scaffold that mimics native heart valve architecture. The functionality of the valve was tested with a pulsatile flow bioreactor. Initial studies demonstrated that our design allows for natural movement of the root and closure of the cusps. Improvements are needed to increase the effective orifice area (EOA) during valve opening. Current work focuses on increasing EOA with a

redesign of the scaffold architecture and cauterizing the scaffold edges to eliminate backflow. Future work includes seeding the scaffold with cells that will be cultured in a bioreactor to foster growth and development while encouraging remodeling.

Poster #47

Learn EHR with TeachEHR

Faculty Mentors: Nancy Meehan, Nursing, Roy Pargas, School of Computing

Students: Brittany Watson, Kevin Vandermolen, Taj Heyward, Ben Velky, Loren Klingman, Ashley Williams, Lisa Jennings, Casey Gooden, Lauren Rhodes

Our creative inquiry team aims to determine if teaching new skills in a familiar environment can help students apply those skills in an unfamiliar setting. This year, our team focused on teaching the intake and output portion of Electronic Health Records (EHR) through our educational tool (TeachEHR). TeachEHR is a student-created simulation of an EHR system designed to introduce EHR competencies to students. The government is mandating that all health facilities implement an EHR system by the year 2014. It is crucial that students become familiar with the electronic charting methods. Our system resembles popular social networking sites, but contains features that healthcare professionals have to be familiar with while using commercial EHR systems. The new intake and output portion enables nursing students to practice entering patient data regarding the intake of various liquids and the output of bodily fluids. Accuracy in charting is vital to patient safety. Research has been sponsored by: Creative Inquiry, Clemson University Calhoun Honors College.

Poster #48

***Walk & Roll in My Shoes*: A Blended Immersion Experience for Disability Awareness.**

Faculty Mentors: Arlene Stewart, Student Disabilities Services, Elaine Richardson, Academic Success Center

Students: Richard Jenkins, Sutton Fain-Schwartz, Stephen Gosnell, Tiara Johnson, Jeff Dube , Dan Gabriel

What are the implications of understanding and developing Applications of Universal Design in higher education? We adopted participation in a unique experience conceived by Student Disability Services and the Office of Access and Equity, "*Walk & Roll in My Shoes*: A Blended Immersion Experience for Disability Awareness." The objective of *Walk & Roll* is to increase empathetic understanding of persons with disabilities at Clemson University through immersion rather than simulation, in conjunction with facilitated discussion. Actions plans were created that recognize multifaceted diversity which, when implemented, can improve accessibility for everyone. In presenting our involvement in the project we will implement the fundamental Universal Design principles by ensuring multisensory input for a better understanding by all. "Disability is a condition that results from limitations imposed on an individual, with or even without diagnosed medical conditions, from external factors" (Gilson & DePoy).

Poster #49

Linking Specialty Crops Producers and Institutional Food Services: Food Safety Concerns & Considerations

Faculty Mentor: Kathryn Boys, Applied Economics and Statistics, Beth Kunkel, Food Science and Human Nutrition

Students: Caitlin Bennett, Elizabeth Dixon, Debra Jones, Laura Westray

This project seeks to improve understanding of the food safety concerns and regulations which limit the ability of Southern specialty crops producers to serve as suppliers for institutional food services (schools, hospitals, correctional facilities etc.). To gain an in-depth understanding of these marketing constraints, two series of focus group meetings were held: one with specialty crops producers, and one with institutional food services at locations in SC, NC, and GA. In addition, a one day regional meeting was held in with all stakeholders in this marketing channel to identify, discuss, and prioritize recommendations of how to address these challenges. Through this creative learning experience, a multidisciplinary group of students learned about qualitative research methods and were each responsible for organizing, moderating, analyzing and documenting results from one focus group meeting. Results from this project are being used as an input into research supported by the Southern-SARE.

Poster #50

Survey of Consumer Response to Green Labeling on Pizza Packaging

Faculty Mentor: Kay Cooksey, Packaging Science

Students: Eric Haas, Dallas Fletcher

Sustainable packaging is a complex issue for packaging professionals. Green labeling is used to make claims on packages to which consumers may or may not respond. Response may be based on age or beliefs. Further, interest in whether consumers are willing to pay more for a product with green claims was of interest. Based on this study, a greater understanding of how consumers perceive green labeling and how it affects package design was gained.

Poster #51

Validation of Medical Device Packaging

Faculty Mentor: Kay Cooksey, Packaging Science

Students: Sarah Jacks, Layton Glymph, Mackenzie Lussier, Tate Fennell, Kyle Franke, Robert Kastler, Alex Rigsby, Chelsea Thompson, Marie Vaughn, Laura Williams

Validation of medical device packaging has been an issue in industry for many years. Currently ISO 11607 is the most commonly used method for the US and Europe. A typical medical device package was produced at Cryovac in Duncan, SC using different time, temperature and pressure settings for the seals. Seal strengh, dye penetration and bubble tests were performed per ISO and ASTM standards. The standard test methods are a good indicator of possible gross leaks but may not be the best indicator of microbial barrier.

Poster #52

M&Ms versus Hershey's Drops

Faculty Mentors: Paul Dawson, Food Science and Human Nutrition, Rose Martinez Dawson, Applied Economics and Statistics

Students: Marjorie Celestino, Melissa Ciccone, Blaire Davis, Adair Kerrison, Matthew Mead, Emily Wagener

The purpose of this experiment was to compare food advertising claims between two chocolate candies that can supposedly be consumed without leaving residue behind. The first candies tested were brown M&Ms ("Melts in Your Mouth, Not in Your Hands"), which have a hard candy shell, and the second were the Hershey's Drops ("No Candy Shell - No Mess"). In order to test the shell integrity of these, we simulated three different conditions involving increasing temperature increments (hand, mouth, and outside). A candy of each brand was placed on a dry porous surface and another of each brand was placed on a wet porous surface. They were put in the oven for three separate durations of 30 seconds, one minute, and one minute and 30 seconds for each of the three temperatures. The diameter of any residue left behind was measured, and the candies were weighed after each test and compared with their initial weights.

Poster #53

Bacterial levels on University Communal Exercise Equipment

Faculty Mentor: Paul Dawson, Food Science and Human Nutrition

Students: Zack Vincent, Emily Martinez, Austin Taylor, Jessica Ferguson, Mary Barnes, Catherine Bailey, Kevin Johnson, Danielle Lynn

In the spring of 2011, a creative inquiry team under faculty mentor Dr. Dawson conducted a microbiological study to determine the presence of bacterial contamination on workout equipment in Fike Recreational Center. The team conducted tests on various pieces of equipment including: mats, weight benches, exercise balls, elliptical handles, free weights, universal bars, hand sanitizing station, water fountain, and stationary bikes. The team split into groups and took weekly samples of different equipment. Surfaces were sampled by swabbing and analyzed using surface plating. The results confirmed various contamination levels throughout the recreation center. A comparison of the equipment types revealed a range for contamination, with workout benches containing the highest levels and stationary bikes containing the lowest levels. Contamination of the equipment substantiates the ability of bacteria to be transferred from person to person in a gym setting. Additionally, food products consumed in a gym could become contaminated by bacteria.

Poster #54

Sodium Lauryl Sulfate: Antimicrobial Activity against *Listeria monocytogenes* and Absorption in Food-Grade Powders

Faculty Mentor: Paul Dawson, Food Science and Human Nutrition

Student: Danielle Lynn

This study was a senior honors research project through the Department of Food, Nutrition, and Packaging Sciences. Research focused on the compound sodium lauryl sulfate (SLS), which can act as an antimicrobial agent against certain foodborne pathogens, including *Listeria monocytogenes*. The experimental procedure evaluated the absorption and release of SLS from food-grade powders. A powder carrier allows for a variety of application methods, including direct dusting on food product surfaces or as a packaging film coating. The intended goal of the research was to develop a food-grade antimicrobial powder, which could act through food surface contact, rather than being added during food processing. Results for the efficacy of the experimentally prepared powders did not demonstrate antimicrobial activity, since SLS was not released from the powders.

However, the procedure did confirm the antimicrobial activity of SLS against *L. monocytogenes* and showed that this compound could be absorbed by the powders.

Poster #55

Re-engineering Medical Training Simulators

Faculty Mentors: Delphine Dean,Bioengineering, Jiro Nagatomi, Bioengineering

Students: Beth Tumblin, Nadine Luedicke, Kaitlin Grove, George Fercana, Melissa Dunphy, Molly Townsend

The long-term goal of this CI is to re-design existing medical simulators to improve training of students in challenging medical procedures. Our current focus is improving central venous catheterization (CVC) simulation, a procedure for inserting a catheter through a large vein in the neck and into the heart. The CVC procedure is one of very high risk, with substantial possible complications. With the target veins so close to the lungs and vital arteries, procedural errors can be fatal. Many current simulators on the market do not allow effective training, are expensive and inconvenient, and are not anatomically accurate. Some of the aforementioned shortcomings with existing designs include the lack of a rotatable head, necessary anatomical landmarks for accurate needle placement, and mechanism for patient inclination. Our prototype addresses these issues. We are currently seeking patents on our improvements to the simulators and examining possible business ventures. Funding: Creative Inquiry.

Poster #56

Engineering Medical Technologies for the Developing World

Faculty Mentors: John Desjardins, Bioengineering, Delphine Dean, Bioengineering

Students: Kaitlyn Harfmann, Maglin Halsey, Tyler Youngman, Andrea Dicks, Britton McCaskill, Lauren Sosdian, Marcella Elpers

According to the Global Health Workforce Alliance in 2010, Africa is in need of an additional 1.5 million health care workers, and the medical resources to support its growing population. Although medical instrumentation and devices are available from aid organizations and donations, these are often broken and replacement parts are unavailable. Therefore, there is great need throughout developing African nations for novel medical technology, which can be maintained locally using commodity parts. Our Creative Inquiry group has started an Engineering World Heath chapter at Clemson University, and we are working to design, construct, and deliver novel biomedical devices that are both affordable and effective for the developing world. We are currently working with local clinicians at MUSC and international health care partners in Tanzania to design and test new medical instrumentation that will meet the needs of doctors in the areas of neurosurgery, trauma, and pediatrics.

Poster #57

Freshmen Design Experiences in Bioengineering

Faculty Mentor: John Desjardins, Bioengineering

Students: Katelyn Rye, Donald Benza, Colin Burns-Heffner, Jessica Cavanan, Charles Devon, Laura Gorrell, Desiree Haywood, Jarrett Lucero, Patrick Ovington, Jamie Ralston, Daniel Ruiz, James Webster

Teams of Bioengineering seniors and freshmen will use this Creative Inquiry experience to tackle open-ended biomedical design challenges. Students develop communication and team skills, interact with faculty, industry or clinical partners, and learn design skills to brainstorm, build and test solutions to real-world bioengineering problems. The goals of this program are to 1) Introduce interested freshmen to exciting design experiences that are intended to educate them about what the field of bioengineering encompasses, 2) Give freshmen immediate and tangible access to bioengineering educators, facilities and administrators who can assist them with decisions and choices about their future academic path, 3) Give Freshmen an opportunity to formally and informally interact with upperclassmen so as to be able to ask questions relevant to the student body, and 4) Give bioengineering seniors a chance to mentor under classman, and offer advice (and thus reflection) about their undergraduate experience.

Poster #58

The Study of Major Pathways Involved in Lifespan Extension in *C. elegans* when Supplemented with Cranberry

Faculty Mentor: Yuquin Dong, Biological Sciences

Students: Monique Bonaccorsi, Brittany Lehmann, Holly Sweet

The world's growing elderly population is expected to continue to increase greatly over the next three decades. This is a cause for concern in our global health care systems. Many are in search of innovative and attainable resolutions to this problem. One alternative is nutritional intervention to combat the body's natural process of aging. Cranberries and cranberry products have shown to have significant health benefits on cancer and heart disease prevention. The benefits of cranberries and cranberry products on longevity have recently emerged. However, little is known about the roles of cranberry on lifespan regulation mechanistically. To fully understand the efficacies of cranberry consumption on longevity, we propose to examine the effects of cranberry supplementation on major life span determinants, using the genetic model *C. elegans*. We will investigate whether cranberry interferes with the functions of insulin/IGF signaling, a key pathway of life span regulation, and SIR-2.1, another key regulator of aging. The findings from this research should uncover the anti-aging benefits of cranberry on prolongevity in humans.

I would like to express my appreciation to my supervisors, Dr. Yuqing Dong, Dr. Min Cao, and Sujay Guha. Thank you for all your wisdom and guidance that you share with me in lab.

Poster #59

Interventions That Positively Influence Resilience

Faculty Mentors: Shirley Timmons, Nursing, Margaret Wetsel, Nursing

Student: Ruth Geide

Resilience is defined as both a positive dynamic process and an outcome that occurs after adversity. This ability to cope successfully when faced with adversity requires internal and external supporting factors. Internal supporting factors include: autonomy, self-esteem, sense of purpose and future, and problem-solving skills. External supporting factors involve positive relationships between individuals and their school, family and community environments. Interventions that include these

factors foster resilience. Developing resilience-based interventions is of significant importance to advanced practice nurses (APNs) and other health care professionals. This paper describes, evaluates, and critiques the following cognitive-based interventions: a) Penn Resiliency Program; b) Strength-focused Meaning-oriented Approach to Resilience; c) Keeping Families Strong; and d)Transforming Lives Through Resilience. Based on these findings, implications are presented as to the APNs role in clinical practice, research, and education.

Poster #60
Determining Optimal Caption Placement Using Eye Tracking
Faculty Mentor: Andrew Duchowski, School of Computing
Students: Nicole Snell, Andrew Outz, Maini Prabudh

A significant amount of work has been done on classifying closed captions and determining their optimal visual format (presence/absence of boxes, shadows, font size, etc.). However, to date, little has been done on quantitatively determining the ""best"" strategy for placement of captions. In this study, the effect of caption placement on information intake is examined. Eye movement data is used to quantitatively analyze the effect of four different captioning methods. Information intake is measured via a 4-category comprehension quiz that measures key differing aspects of captioned videos. Results indicate that caption placement can have significant effects on reading time, number of saccadic crossovers, and ratio of fixations on captions. This contribution could be used to improve existing caption placement strategies.

Poster #61
Transition to Motherhood: Expectations vs. Reality
Faculty Mentors: Lisa Duggan, Nursing, Nancy Meehan, Nursing
Students: Amy Turner, Holly Anderson

This is a research study lead by Lisa Duggan. The overall goal of this research is to define the transition to motherhood. This new knowledge will be used to identify points of intervention to prevent negative outcomes after pregnancy, such as postpartum depression, child abuse, and neglect. The segment of research conducted by Amy Turner and Holly Anderson will contribute by exploring the relationship between women's expectations going into motherhood and the reality of their experiences. Five semi-structured interviews were conducted with new mothers. The interviews were voice-recorded and transcribed. The transcriptions will be analyzed for recurring themes related to how women's expectations and circumstances during the transition to motherhood affect the outcome of their pregnancies. The findings will help provide a better understanding of the transition process.

Poster #62
Cross-Cultural Analysis of Postpartum Depression
Faculty Mentors: Lisa Duggan, Nursing, Nancy Meehan, Nursing
Students: Emilie Wilson, Helena Williams

Postpartum depression (PPD) is a disease that affects millions of women around the world. This unique disease manifests itself in different ways depending on a woman's cultural, ethnic, physiological, and social background. The disease can result in harm to the mother or child and ultimately devastate families. An understanding of PPD is necessary so that mothers around the world can receive help before physical or emotional harm befalls their families. Any interventions that can be discovered to

prevent this tragic disease from taking hold of another mother's life will be beneficial to the infant and family as well. We will be performing a correlational study/pilot study, since this is the first study of its kind to determine the relationship between Postpartum Depression and Caucasian or Latino background. The research team will conduct the research in Spring 2010 by visiting the Oconee Women's Clinic and collecting specific information from 5 to 10 women in the Latino population and 5 to 10 women in the Caucasian American population. The Edinburgh Postnatal Depression Scale as well as a demographic questionnaire will be used to collect data from these women. We are currently in the process of collecting data. Results and Conclusions are pending.

Poster #63

Spring 2011 Creative Inquiry Aims to Reduce Surgical Site Infections in the Operating Room

Faculty Mentor: Felix Barron, Food Science and Human Nutrition

Students: Austin Abellana, Katie Roach, Anna Frank, Andrew Hunter, Julia Killingsworth, John Pantuosco, Alexa Richtmyer, Ashleigh Scheidler, Eric Swinton, Alisa Tikal

The members of the Spring 2011 semester of BIOSCI 494 Creative Inquiry class are involved in working with risk assessment to reduce the numbers of post-surgery surgical site infections in hospitals. Reports show that in the past few years, there has been an increase in the number of nosocomial, or hospital-acquired infections, many of which have been traced back to the operating room. Over the semester, the goal was to find the source of these infections and find ways to reduce them. So far, critical steps have been identified in the operation process in addition to the identification of specific bacteria that serve as the sources of infections, and unique ways to prevent these infections have been compiled. Risk assessment analysis of each step in the operation process in addition to the utilization of HACCP plans have been used to evaluate each aspect of the situation and reduce skin diseases in a typical operating room. The final study will show a complete risk assessment of a typical operating room process.

Poster #64

Redesign of Schneider Electric Pressing Process with an Ergonomic Perspective

Faculty Mentor: Anand Gramopadhye, Industrial Engineering

Students: Locuyen Quach, Ian Murrah, Shadera Martin, Michael Johnson, Yuan-Han Huang

The objective of this study was to reduce ergonomic strains and number of repetitive motions within pressing process at Schneider Electric Seneca. Rapid Upper Limb Assessment (RULA) was conducted to systematically analyze the part pressing process and identify the harmful or awkward postures exhaustively. Results indicated that the postures with a risk of injury (RULA=6) were concentrated on rotating a part, bending a part, and aligning a part onto machine during the procedure. High RULA scores were observed on individual body parts at upper arm, wrist, and neck. Based on the findings, the design team provided a series of ergonomic interventions to reduce the physical strains for part pullers with all ergonomic suggestions meeting the Schneider Electric safety standards.

Poster #65

Redesign of Schneider Electric Part Puller Process with an Ergonomic Perspective

Faculty Mentor: Anand Gramopadhye, Industrial Engineering

Students: Andrew Messick, Kalyn Kelly, Ashley Holloway, Spencer Clary, Yuan-Han Huang

The objective of this study was to determine and reduce unsafe material handling motions in parts pulling process at Schneider Electric Seneca. Rapid Upper Limb Assessment (RULA) was conducted to systematically analyze the parts pulling process and identify the harmful or awkward postures exhaustively. Results indicated that the postures with an immediate risk of injury (RULA=7) are concentrated on picking parts from the shelves. High RULA scores were observed on body parts at neck, back, and shoulder during the process. Based on the findings, the design team provided a series of ergonomic interventions to reduce the physical strains for part pullers with all ergonomic suggestions meeting the Schneider Electric safety standards.

Poster #66

Ergonomic Assessments for Redesigning Schneider Electric Part Puller Process

Faculty Mentor: Anand Gramopadhye, Industrial Engineering

Students: Yuan-Han Huang, William Gilliam, Cheryl Haynsworth, Rahul Karanth, Ann Bennett Thomas

This study focuses on reducing and eliminating ergonomic strains on part pullers in Schneider Electric Seneca. A systematic task analysis (TA) was conducted to analyze the part pulling process in conjunction with Rapid Upper Limb Assessment (RULA) to evaluate the harmful postures within each task. Results showed that part pullers have awkward postures with an immediate risk of injury (RULA=7) in: picking up heavy parts from low level platforms, picking up heavy parts from high level platforms, and picking up light parts from high level platforms. Furthermore, tasks with lower RULA scores (RULAR=6) and highly repetitive motions were also addressed. According to the findings, the design team provided a series of ergonomic interventions to reduce the physical strains for part pullers with all ergonomic suggestions meeting the Schneider Electric safety standards.

Poster #67

Impedance Properties of Gold Nanoparticle Reinforced Hydrogel Membranes

Faculty Mentor: Anthony Guiseppi-Elie, Chemical Engineering

Student: Zachary Seigel

Chemically responsive smart materials may be fabricated by the combination of electroconductive materials with responsive hydrogels. This project synthesizes and characterizes composites of 20 nm colloidal gold nanoparticles within responsive poly(HEMA)-based hydrogels. These hydrogels are synthesized to contain biomimetic and biocompatible moieties, which make them excellent candidates for use in implantable biosensors. Hydrogel containing 0.0005 wt%, 0.001 wt% and 0.005 wt% gold nanoparticle was applied to interdigitated microsensor electrodes (IMEs). The complex impedance of the IMEs was measured on a Solatron Frequency Response Analyzer and modeled with Equivalent Circuit Modeling. It was observed that increasing the amount of gold nanoparticle in the hydrogel increased conductivity and lowered impedance on dry IMEs. This research provides a baseline for future applications of hydrogel-nanoparticle biosensors. Implantable biosensors are being designed to detect a variety of physiological molecules, ranging from measuring glucose levels in diabetics to detecting antibodies that are produced in response to infectious disease.

Poster #68

Ecology and Dispersal of a Newly-Introduced Aquatic Organism (*Bellamya japonica*)

Faculty Mentor: John Hains, Biological Sciences

Students: Ronald Jacobs, Lindsay Heater, Larry Jones, Melissa Hulbert, Kelly Bickle, Charles Vanderploeg, Candice Dillitte, Scott Miller, Jamia Burdett

A new invasive species of large aquatic snail was discovered in Lake Hartwell in 2006. We began studies of its ecological relationships and dispersal in 2008. Since it is a live-bearing organism and produces no free larval form, its dispersal depends on its own motility or transport by other organisms. Field studies indicated a negative phototactic response. Our laboratory studies are testing this as well as geotaxis and we are exploring size-selective predation as a possible explanation for their apparent tendency to avoid exposure to light. Moreover, observations indicate an interesting internal fauna in the gut of this exotic species. Our studies will support management of this new invasive species in natural systems, and potentially provide solutions for industrial impacts as well as to help understand the general ecology of invasions. We gratefully acknowledge the support of Clemson's Creative Inquiry Program.

Poster #69

***Basics to Balance*: A Creative Inquiry Initiative to Promote a Healthy Body Weight**

Faculty Mentor: Vivian Haley-Zitlin, Food Science and Human Nutrition

Students: Dana Brodland, Alexandra Musarra, Amber Wiles, Eric Challenger, Shannon Carney

According to the 2005-2006 National Health and Nutrition Examination Survey (NHANES), an estimated 32.7% U.S. adults ≥20 years old are overweight, 34.3% obese and 5.9% extremely obese. Education targeting eating habits, exercise activities, and overall health is essential to obesity prevention and adopting a healthy lifestyle. *Basics to Balance* is an educational program designed to help individuals learn about the food groups, how to read nutrition labels, and the basics of a healthy lifestyle. This study is examining the effects of a 6-week educational intervention on 60 male and female adults receiving weekly instruction. Assessments of individual's weight, height, waist circumference, body composition and nutrition knowledge were conducted before the *Basics to Balance* educational program and will be measured post-intervention. It is our hope that *Basics to Balance* will result in adoption of healthier eating habits and improvement of health-related physical indices. Funding provided by Clemson University Creative Inquiry.

Poster #70

Using Social Networking to Increase Knowledge and Awareness of Healthy Lifestyle Behaviors among Clemson University Students

Faculty Mentors: Rita Haliena, Food Science and Human Nutrition, Angie Fraser, Food Science and Human Nutrition

Students: Lauren Shaw, Lauren Piekarski, Kaitlin Mauney, Meghan Marr, Cari Gracey, Meghan Cantwell, Anna Shaffner

This Creative Inquiry team believes college students are more likely to partake in undesirable eating and activity choices. This could increase weight gain and have lifelong ramifications on their overall health. The purpose of this team's initiative was to encourage college students to incorporate better eating and exercise habits into their daily routine. The team worked with various campus facilities to distribute knowledge and provide these resources for students, such as the creation of a *Facebook* group called Healthy Tiger. The group posted weekly nutrition facts, provided links to outside resources such as *MyPyramid.gov*, and produced *YouTube.com* videos featuring various health topics. To evaluate these initiatives, an online survey was sent to the members of the *Facebook* group (approximately 400 currently) to measure their knowledge, awareness and self-reported changes in lifestyle.

Poster #71

Using Social Networking to Increase Knowledge and Awareness of Healthy Lifestyle Behaviors among Clemson University Students

Faculty Mentors: Rita Haliena, Food Science and Human Nutrition

Students: Allison Shaw, Anna Shaffner, Lauren Piekarski, Kaitlin Mauney, Meghan Marr, Cari Gracey, Meghan Cantwell

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Poster #72

Student Organic Farm: Connectivity and Accessibility

Faculty Mentor: Daniel Harding, Architecture

Student: James Baxley

The team is working to develop the community asset of the Student Organic Farm. The farm, and its reoccurring farmers market, is situated in closely to campus; yet has little public access. In order to increase the success of the farmers market and create possibilities for an education facility, public access is needed. The team has been working since Fall '09 to research, design, and construct new access to the farm. Research has been conducted in four countries and the design has been developed over two years. Construction began at the end of Fall '10 and is continuing through Spring '11. The project received honorable mention from SEED and will be the first structure on a university to receive SEED accreditation. The team is multi-disciplinary and is working with the new Community Research and Design Center, the School of Architecture, Studio South, the farm staff, and SSCS department.

Poster #73

Texturing Complex Surfaces to Improve Human Perception

Faculty Mentos: Donald House, School of Computing

Student: Meng Zhu

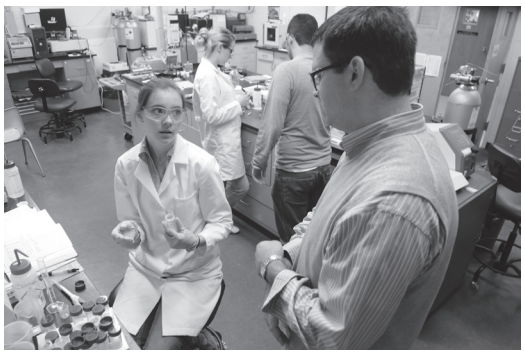
Research has shown that specifically designed textures applied on geometrical surfaces can greatly enhance human perception of the shape, orientation and spatial relationships of the surfaces. This is especially true for overlapping translucent surfaces, or in a stereoscopic display environment. Although this is true, virtually all practical systems for volumetric rendering use no texture. Previous studies that have looked at this issue have used either simple 3D surfaces or terrain surfaces. In this work, we explore the application of textures to more complex surfaces. Such surfaces can come from various sources, for example an isosurface extracted from a volume dataset. The challenge is to generate uniformly distributed grid like textures on complex surfaces that naturally follow the geometry of the surface. We use Catmull subdivided ellipsoid to match the minimum convex hall of the generated isosurface and project that line texture onto the surface. This gives fairly uniform texture following the geometry of the surface. Our end goal is to incorporate the texturing method directly into a fast volume rendering process to enhance the perception of complex surfaces present in a volume dataset.

Poster #74

CU Shop: Clemson's Premier Eye-Tracking Lab

Faculty Mentors: Andrew Hurley, Packaging Science, Chip Tonkin, Packaging Design and Graphics

Students: Alex Tomlinson, Rachel Randall, Molly Herlong, Allender Stewart, Charles Kane, Lindsay Shelton, Sara Cheikelard, Daniel Hutcherson



A collaborative team of 8 senior architecture majors are revamping the state-of-the-art Sonoco Institute at Clemson University! Follow us through the design process, fabrication, and installation at the Sonoco Institute with our class blog: [pkgsc399.wordpress.com]. This creative inquiry team is to designing and fabricating a fully immersive grocery store atmosphere. The project's site is located in the innovative Sonoco Institute. A transitional space has been allocated as a futuristic "eye-tracking lab," to utilize a set of special eye-tracking glasses. The realistic environment illustrated, was inspired by the fresh and crisp designs of grocery stores like Bloom, Fresh Markets, Whole Foods, and Trader Joe's. These stable precedents were used to generate the dynamic atmosphere of the CU Shop. With this new environment, frequent experiments can be conducted inside the Institute to test packaging designed at Clemson and in the professional field. The lab will feature an expandable aisle with virtual capabilities. Drop-down screens will become blank surfaces for digital packaging simulations, used for quick and inexpensive experimentation. This lab is the first of its kind in the nation!

Poster #75

Degradation of Latex Balloons in the Environment

Faculty Mentor: Stephan Irwin, Biological Sciences

Students: Lydia Stiffler, Andy Jenkins

The recent concern over the environmental hazards of balloons in relation to degradation in the environment and consumption of latex balloons by wildlife has caused a recent stir to ban mass balloon releases, such as those exhibited at football games. The controversy has triggered the start of the research anew. Balloons of three color variations (purple, white, and orange) were tested in six environmental variables (control, 6 hr sun, running water, still water, shade, and sun). Color variation showed no statistical differences. By week 10 for both sun and shade there were significant differences as compared to the controls. The results suggest that terrestrial environments provide for a faster rate of degradation than aquatic environments. Other portions of this study include telemetric data on balloon travels, public surveys to mass balloon releases, and effects of latex balloons on wildlife.

Poster #76

The Reduction of Pathogenic *Escherichia coli O157:H7* on Artificially Contaminated Spinach through the Application of a Bacteriophage Cocktail

Faculty Mentor: Xiuping Jiang, Food Science and Human Nutrition

Students: Thomas Yeargin, Spencer Heringa

Food borne illnesses have been on the rise, partly due to increased consumption of raw fresh produce. Current produce decontamination methods are often ineffective. This study aims to evaluate the application of bacteriophages, biological

control agents, for fresh produce decontamination. A six- bacteriophage combination specific to *E. coli O157* was applied to fresh spinach artificially inoculated at 106 cfu/leaf with a three-strain mixture of *E. coli O157:H7*, and the differences in reduction measured. Experimental conditions evaluated include application methods and bacteriophage solutions with different multiplicity of infections (MOI). Dipping spinach in solution containing bacteriophage at an MOI of 280 was determined the most effective method ($p<0.05$) in reducing *E. coli O157:H7* on spinach compared to the phage-free control. Results indicate bacteriophages have potential to reduce *E. coli O157:H7* on fresh produce. Thanks are given to Dr. Jiang for her support and guidance on this research project.

Poster #77

Research Note: A Preliminary Investigation into the Feasibility of Shelf-stable Ice Cream Mix for Retail Food Service Operations

Faculty Mentor: Johnny McGregor, Food Science and Human Nutrition
Students: Sara Sparks, Allison Anderson, Sally Foster, Joanna Gorcesky, Amy Halie, Erin Hiller, Elise Hubbard, Benton Maddox, Corey Meenan, Katie Queen, Bethany Richardson, Hanna Satoro, Benjamin Whittington, Eric Togila, Adriana Wingate

To understand the feasibility of shelf-stable ice cream mix, an investigation into the effects of thermal processing liquid ice cream mix was conducted. Ice cream mix with various starch percentages was subjected to retort processing for fifteen minutes at 250˚F. It was determined that the addition of starch was essential to the stability of the processed product. Starch percentages of 0%, 0.75%, 1%, 2%, 4% and 8% were analyzed. The processed mixes were held under refrigerated conditions until freezing. Utilizing a small batch freezer replicates retail operation procedure. The product's color, flavor, and viscosity were analyzed. An acceptable ice cream product with slight browning and a definite cameral flavor was identified. The retort processed products were more viscous than the control. Heat penetration tests will be conducted to validate the retort process. Additionally, a sensory panel will be conducted to determine the acceptability of the shelf-stable ice cream mix.

Poster #78

Development of a Pediatric Arm Restraint for a Hospital Treatment Room

Faculty Mentors: Todd Schweisinger, Mechanical Engineering, Arlene Johnson, School of Nursing
Students: Devin Walford, Kate Coggins, Russell Corwin, Allison Jarriel, Michael Reardon, Christopher Wenner

Greenville Hospital System University Medical Center Children's Hospital (GHSUMC) requested an arm restraint for a pediatric treatment room. Children may experience discomfort when lying flat on a treatment table during medical procedures. One approach to reduce patient discomfort is to develop an arm restraint that would allow the patient to remain in a sitting position, and it could reduce the number of people required to aid in the stabilization of the patient's arm. The team has conducted external research to clearly define the problem and objective for the project and has constructed an initial prototype. The team is iteratively improving the design, and is currently seeking Institutional Review Board (IRB) approval to conduct a pilot study at Clemson University (Fall 2011) using nursing faculty as research participants. Data from this pilot study will allow the research team to improve the design before filing a patent invention disclosure.

Poster #79

Monitoring Friction and Wear of Sliding Surfaces

Faculty Mentors: Molly Kennedy, Bioengineering, John Desjardins, Bioengineering
Students: Tri Kieu, Brent Lodge, Justin Marro, Caleb Eljach, Ben Hayes, Ben Pope

System parameters (velocity and force), etc. can all influence the coefficient of friction for a system. Since all these factors play a role (and their roles are not always completely understood), the direct measurement of the coefficient of friction and surface wear is often desired. As part of "Team Tribology", we have applied our understanding of friction to rebuild linear reciprocating wear bench. Our poster explains the basic concepts of sliding surfaces, friction, and wear mechanisms. It also details how we have rebuilt our linear reciprocating wear benches and outlines out future work. We would like to thank the Creative Inquiry program at Clemson University for sponsoring our work.

Poster #80

Tires from Renewable Resources: Sustainable Synthesis of Butadiene for Automobile Tires

Faculty Mentors: Christopher Kitchens, Chemical Engineering, Thompson Mefford, Materials Science and Engineering
Students: Tyler Barzee, Dylan Bruckner, Angela Hartmann, Nicole Hoffman, Elizabeth Tennant

For our project, we are attempting to find a solution to a problem presented to us by Michelin- we are trying to find a cost effective and efficient way to synthesize 1,3-butadiene as an alternative to the current process of using petroleum. This project was motivated by the limited nature of petroleum, the cost of ethanol, and the increasing competition for petroleum and ethanol resources. As a starting point for this research, we looked at the Department of Energy's Top Value Added Chemicals from Biomass list. We selected succinic acid and levulinic acid as viable starting points based on their chemical structures. Different pathways were considered using these materials and the yield efficiency was calculated. Levulinic acid was found to have the most potential to synthesize 1,3-butadiene. Finding an alternative way to create 1,3-butadiene is beneficial since it is a primary component of Michelin tires.

Poster #81

Online Incivility in the Workplace: Impact on Performance and Attitudes

Faculty Mentor: Robin Kowalski, Psychology
Students: Celeste O'Donnell, Brandee Ellis, Samantha Jefferson, Kirsten Nielson, Gary Giumetti

Workplace incivility is associated with many negative outcomes, including decreased performance and increased turnover intentions. The current study examines the relationships between cyber-incivility and performance, turnover intention and mood. Thirty-nine undergraduate students completed two sets of math tasks using a computer. The two sets were assigned by different supervisors via email; one supervisor included uncivil comments along with each task and the other included supportive comments. Task performance (percent of questions correct) was significantly lower in the uncivil as compared to supportive condition. Willingness to work with the supervisor again was significantly lower in the uncivil condition, and negative mood was significantly higher in the uncivil condition than the supportive condition, and did not differ by gender. These findings suggest that cyber-incivility may lead to decreased task performance, turnover intentions, and increased negative mood, and point to the importance of addressing cyber-incivility to reduce negative outcomes at work.

Poster #82
Bereavement: A Silent Epidemic on Clemson University's Campus
Faculty Mentor: Robin Kowalski, Psychology
Student: Jessica Dean

The experience of loss is one that most individuals will have in their lifetime, and the impact of losing someone can be substantial. The current study investigates the relationship between adjustment to loss, strength of social support system, and coping style. In addition, the grief services offered by Redfern Health Center at Clemson University were examined for student awareness, use, and perceived benefit. Participants included 180 undergraduate students ranging from 18 to 35 in age. Participants answered questions about their experience of loss in addition to completing measures associated with the inquiries of this study. Overall, a significant relationship was observed between adjustment and coping style, and social support proved to be a predictor in some cases. Future research might consider a longitudinal study of these relationships. Dr. Robin Kowalski served as the faculty advisor for this investigation.

Poster #83
The Need to Belong and Motives for Internet Use
Faculty Mentor: Robin Kowalski, Psychology
Students: Katie Kendrick, Sarah Sheek, Scott Jones, Micah Lattanner

This study is currently investigating the relationship between the trait measure of belonging needs and the associated traits related to an individuals' motivation for Internet use. According to Papacharassi & Rubin (2000), Internet behavior is motivated by five factors: interpersonal utility, to pass time, to seek information, convenience, and entertainment. A positive correlation has been found between interpersonal utility and trait measures of belonging needs. To investigate this relationship, 100 college-aged students from a large Southeastern University are completing the Need to Belong Scale, an Internet Motive Scale, and an Expectations for Relational Repair via the Internet Scale. In addition, participants completed the Rosenberg Self-Esteem Scale, Rejection Sensitivity Questionnaire (RSQ), and the Positive and Negative Affect Scale to investigate additional correlations. Having a better understanding of the relationship between the Need to Belong and motives of Internet use has strong implications for the uncovering traits related to engaging in and relying upon social behaviors online.

Poster #84
Priming Empathy in Cyber Bullying Situations
Faculty Mentor: Robin Kowalski, Psychology
Students: Alison Richman, Sarah Louderback, Elisabeth Johnson, Rebecca Fulmer, Stephanie Freeman

Media reports have called attention to the tragic consequences that can follow traditional bullying and cyber bullying, raising the question of what measures can be taken to reduce the incidence of cyber bullying. Perhaps if empathy could be primed among bystanders, they would be more likely to intervene in cyber bullying situations. Toward this end, this study measured whether college students can be primed to empathize with a bully, victim, or a bystander. Participants were given a written scenario and instructed to envision themselves as either a boss (i.e., bully), secretary (i.e., bystander), or intern (i.e., victim). Participants primed with the boss scenario showed more empathy toward bullying victims and less empathy toward bullies than participants primed with the secretary scenario. Thus, participants assigned to a higher status individual in the prime adopted a sense of responsibility that led them to empathize with lower status individuals, which represent the victims in the case of cyber bullying.

Poster #85
Athletic Attainment
Faculty Mentor: Robin Kowalski, Psychology
Students: Sophie Woorons-Johnston, Stephanie Freeman

This research investigated three topics in regards to youth tennis players: correlation of athletic goals between parent and child, athletic engagement in children, and the application of entity and incremental theories in athleticism. The goal was to help the child gain insight into his/her realistic athletic ability and ambitions versus perceived ability and desired goals, reconcile disconnect in parent-child goals, and develop a protocol for the child to become the best athlete he/she can be. Youth tennis players aged 10-17 and their parents participated. Parent and child goals were similar (r = .68). An assessment done by the players' coach revealed that the majority of those children who scored high in engagement had the potential to reach their desired goal in relation to tennis (e.g., playing college tennis). While the youth tennis players were oriented toward entity, they rated high in athletic engagement. This entity orientation may be a function of their age.

Poster #86
***Dirt to Food*--Creating a Sustainable Local Food System One Garden at a Time**
Faculty Mentors: Beth Kunkel, Food Science and Human Nutrition, Jennifer Goree, Redfern Health Center
Students: Brittany Lusk, Bethany Avera, Ashley Buffington, Mary Carney, Melissa Macher, Jessie McGinty, Rebecca Sayce, Michelle Steele, Blake Story, Mary Stuckey, Robert Wood, Ruhiyyih Young

The *Dirt to Food* CI's goal is to create a vibrant local food system that provides the structure for community members to make more sustainable food choices. We first assess the contributions of established community organizations, programs, and policies in order to avoid redoing their work and to learn from the past. We then establish relationships with community members by participating in community activities. Based on results of our community needs assessment, we work with the community to develop a community gardening program. We employ cross-generational teaching to educate members to care for their garden. Through this process we create opportunities for members to experience food from the ground-up. The *Dirt to Food* CI will continue researching best practices for building social capital to make lasting changes to our food system. This semester we will focus on policies, systems and environments that facilitate a healthy and sustainable community.

Poster #87
Clemson Farm-Fresh Market Development
Faculty Mentor: Beth Kunkel, Food Science and Human Nutrition
Students: Melissa Valiante, Elizabeth Sommerfel, Kaitlyn Peson, Alysia Norton, Casey McCullough, Jamie Martin, Matthew Finley, Meryl Anderson, Ashley Adams

We are collaborating to increase awareness, attendance, and overall quality of the Clemson Farm-Fresh Market, which was created in September 2009. Research will include acquiring successful marketing techniques from other campus Farmer's Markets, brainstorming ideas that will make our market unique and exciting, seeking out the best local vendors, and campus and community advertising. We have begun the marketing process by

creating posters, flyers, buttons, and a Facebook group, and are adding our information to campus and local newspapers and radio stations. Themes have also been developed for each market to add excitement and attract the most customers possible. Successful markets are important as to give college students to purchase locally grown and/or organic products, to give local farmers an opportunity to sell their products, and to provide a fun social gathering for students and the community. Supported by SC Department of Agriculture and Creative Inquiry funds.

Poster #88
Exploring Petroleum Industry Safety By Conducting HFACS Analyses
Faculty Mentor: Mary Beth Kurz, Industrial Engineering, Scott Shappell, Industrial Engineering
Students: Matt Teodori, Justin Harris, Sean Whetsel, Bhavik Patel, Jainee Patel

In the petroleum industry many demographic factors have been used to conduct descriptive analysis related to safety. This research focuses on using the original accident, injury, and fatality incident reports from the petroleum industry. The uniqueness of this research is that the incident reports were parsed into factors outlined in the Human Factors Analysis and Classification System (HFACS), creating binary reports to be analyzed. Applying analytical techniques, the HFACS data was transformed to identify the underlying causes of incidents pertaining to safety in the petroleum industry. The underlying factors were compared to other industry standards to compare HFACS performances across industries.

Poster #89
iNurse
Faculty Mentor: Janice Lanham, Nursing
Student: Mikala Loberger

Apple's iPods and iPhones have been an interest to physicians and nurses for a couple years now. The integration of the mobile devices in hospitals and other medical facilities is currently being researched for the effect on the efficiency of care and reduction of error as well as medical applications used on a regular basis for medical professionals. Clemson freshman nursing students were asked to conduct research on iPods in nursing and their effect on patient care. Apple iPods were found to increase efficiency by eliminating wasted time for locating a free computer to input patient data, reduce likelihood of errors, and allows the patient data to be easily obtained by separate parts of the medical facility that is in need of it. Overall, the integration of iPods and iPhones will improve quality of patient care greatly.

Poster #90
Advanced Architectural Geometry: Subdivision Surfaces
Faculty Mentor: Dave Lee, Architecture
Student: Mitch Newbold

As technology and contemporary architecture continues to shift, today's structures have an added level of mathematical complexity. These buildings and forms are generating using various software applications. This research looks to understand the underlying mathematics of subdivision surface geometry and how they are generated and manipulated. The result of the research is pamphlets to be used as reference for architecture students to greater understand these geometry typologies.

Poster #91

Sustainable Lighting Initiative

Faculty Mentors: Cindy Lee, Environmental Engineering and Earth Science, Scott Templeton, Applied Economics and Statistics, Patricia Zungoli, Entomology, Soil and Plant Science

Students: Gabriel Fair, Gary Nihart, Larissa Clarke, Bethany Avera

Clemson University has committed to reducing energy use while controlling costs. The goal of this project is to identify a sustainable lighting option for outdoors. We evaluated two light emitting diode (LED) options, an EvoLux bulb and a Visible Light Solar retrofit fixture; and 100-watt incandescent bulbs currently in use. Energy consumption for all three options was recorded daily for 125 days. Luminosity was measured to determine if safety standards were met. Preliminary data indicate the retrofit uses less energy than the incandescent bulb and produces more lumens than either the EvoLux or incandescent bulb. However, the Evolux option uses less energy but generates less brightness than the retrofit. Information about market prices, lifespan, and energy use of each will be used to calculate discounted costs over time. Our results will be used to make recommendations to Clemson's Facilities Department about reducing energy use and costs of outdoor lighting.

Poster #92

A Morphological Comparison of Adult Lepidopteran Mouthparts: Is the Vestigial Proboscis Functional?

Faculty Mentor: Matthew Lehnert, Entomology, Soil and Plant Science

Students: Dylan Djani, Jessica Grant

Butterflies and moths, or Lepidoptera, acquire fluids such as water and nectar with their proboscis. The proboscis is a tube-like structure that consists of two elongated maxillary galeae that are sealed together with interlocking hooks and overlapping plates called ventral and dorsal legulae, respectively. Some Lepidoptera have been described to possess a vestigial, or nonfunctional, proboscis. We studied and tested the functionality of vestigial proboscises with scanning electron microscopy (SEM) and feeding trials with red food coloring, which were followed by dissections. Our results indicated that the vestigial proboscis of the moth species studied here have similar structures as functional proboscises, including chemo-sensilla. In addition, our feeding trials and dissections demonstrated that these moths possess a complete gut. These results suggest that the vestigial proboscis may still be functional in some Lepidoptera species, and possibly used to acquire fluids such as water from dew-droplets.

Poster #93

The Heart of the Neighborhood: Neighborhood Transformation Begins with University-Community Collaboration

Faculty Mentors: Mary Beth McCubbin, Paul Russell, Planning and Landscape Architecture

Students: Susannah Horton, Elise Herron

Burnette Park is a small pocket park in a socially and economically diverse neighborhood in Cayce, SC. Students and faculty at Clemson University are working with the local government, residents and parks department officials to renovate the park in hopes of reinvigorating the community. Using a service learning model, professors and students at Clemson collaborated with key stakeholders in Cayce to come up with a design that met the needs of the residents and offered students a chance to learn valuable skills needed in the field of landscape architecture. The a.LINE.ments studio at Clemson specializes in service learning and in exposing students to real world projects, both semester long and long term. The Burnette Park plan turned from a short, semester master plan proposal into a long term volunteer based implementation project. This Clemson University – City of Cayce collaboration has enriched the lives of students, faculty and community members.

Poster #94

The Relationship Between Blood Pressure and Perception of Emotion in Faces

Faculty Mentor: James McCubbin, Psychology

Students: Ginny Ross, Leah Diggs, Chelsea Scott, Jack Gregory, Kaylee Soileau, Amanda Schroeder

The relationship between blood pressure control mechanisms and central nervous system function has not yet been fully explored. Studies of emotional dampening in pre-hypertension suggest that persons with a higher risk of developing hypertension may show reduced perception to stimuli with emotional content. This study examined the relationship between resting blood pressure level and perception of emotions expressed in pictures of human faces. Resting blood pressure was determined in 55 adults by oscillometric methods using a Dinamap Vital Signs Monitor. Participants then rated the type and intensity of emotional content in 35 pictures of faces. Results were analyzed by correlations between blood pressure and the accuracy and intensity of positive and negative emotions. Results are discussed based on the theory of emotional dampening in the early stages of development of hypertension.

Poster #95

The Relationship Between Blood Pressure and Perception of Emotion in Narrative Sentences

Faculty Mentor: James McCubbin, Psychology

Students: Blair Martin, Jasmine Luster, Melissa Hibdon, Daniell Brower-Lingsch, Michael Brophy, Grace Robinson, Rebecca Triplett

The relationship between blood pressure control mechanisms and central nervous system function has not been fully explored. Studies of emotional dampening in hypertension development suggest that persons with higher blood pressure may show reduced responses to stimuli with emotional content. The present study examined the relationship between resting blood pressure level and perception of emotions expressed in narrative sentences. Resting blood pressure was determined in fifty-five young adults by oscillometric methods using a Dinamap Vital Signs Monitor. Participants then rated the type and intensity of emotional content in thirty-five narrative sentences. Results were analyzed by correlations among blood pressure, and the accuracy of positive and negative emotions. Results are discussed in light of the theory of emotional dampening in the early stages of hypertension development.

Poster #96

Interactions of Gold Nanoparticles with Microbial Biofilms

Faculty Mentor: Tamara McNealy, Biological Sciences

Students: Mary Caroline Saleeby, Cassandra Horton, Kendall Headden

Microbial biofilms can be found covering almost all available surfaces in a wide variety of aquatic environments, both natural and man-made. While these biofilms are important for maintenance of ecological homeostasis, they can cause problems in certain industrial filtration systems and aquaculture infrastructures. Three bacterial species that are known to form biofilms in water: *P. fluorescens*, *S. epidermidis*, and *F. tularensis* will be analyzed to investigate the effect of 18nm gold nanoparticles on microbes. First, the replication of planktonic bacteria will be analyzed via growth curves. Second, biofilms of the bacteria will be analyzed using confocal microscopy. Finally, the interaction of the biofilm with amoebae will be analyzed. We hypothesize that 18nm AuNPs do not affect viability and replication of planktonic phase bacteria but do exert effects on biofilm bacteria. The results obtained through this project will provide information and insight for the development of non-toxic biofilm eradication methods for man-made environments.

Poster #97

Female Maturation and the Effects it has on Population Dynamics

Faculty Mentors: Michael Childress, Biological Sciences, Mark Cawood, Mathematical Science, Jan Medlock, Mathematical Science

Student: Stefanie Wagner

Blue crab (Callinectes sapidus) female reproductive development plays an important role in successfully maintaining the crab population. To study the role of the timing of reproductive maturation, we created a mathematical model with two different female cohorts. The first cohort mature early, overwinter at a large size, and produce all of their offspring in the following spring, summer, and fall. The second cohort arrive late in September, overwinter at a small size, spend the spring and summer growing, and finally produce some offspring in the fall, then overwinter again, and produce the remaining offspring the next summer and fall. The mathematical model uses parameters such as temperature and salinity, which impact survival and, ultimately, the dynamics of reproduction. We estimated the reproductive value of each type of female in different temperatures and salinities to understand the role of variation in female reproductive development in maintaining the population under environmental variability.

Poster #98

Tires from Renewable Resources: An Investigation of Alternative Routes to Butadiene Monomers for Michelin

Faculty Mentor: Thompson Mefford, Materials Science and Engineering, Christopher Kitchens, Chemical Engineering

Students: Nicole Hoffman, Angela Hartmann, Liz Tennant, Dylan Bruckner, Tyler Barzee

For our project, we are attempting to find a solution to a problem presented to us by Michelin- we are trying to find a cost effective and efficient way to synthesize 1,3-butadiene as an alternative to the current process of using petroleum. This project was motivated by the limited nature of petroleum, the cost of ethanol, and the increasing competition for petroleum and ethanol resources. As a starting point for this research, we looked at the Department of Energy's Top Value Added Chemicals from Biomass list. We selected succinic acid and levulinic acid as viable starting points based on their chemical structures. Different pathways were considered using these materials and the yield efficiency was calculated. Levulinic acid was found to have the most potential to synthesize 1,3-butadiene. Finding an alternative way to create 1,3-butadiene is beneficial since it is a common component in Michelin tires.

Poster #99

Soil Inventory of Kimwood Court, Aiken, SC

Faculty Mentors: Elena Mikailova, Christopher Post, Forestry and Natural Resources

Students: Theresia Sullivan, Julia Sharp

The objectives of this study were to conduct soil inventory of a residential plot in Aiken, SC using Web Soil Survey, and to develop a soil management plan. Two soil series are found within the property: Vaucluse-Ailey (predominant, 73.1% of AOI),

and Troup, which belong to the soil order of Ultisols. Both soils are somewhat limited in their suitability for dwellings with basements, and both are not prime farmland. Troup is somewhat limited for septic absorption field, and Vacluse-Ailey is very limited for septic absorption field. Troup soil is better suited for loblolly pine (*Pinus taeda L.*) with a rating of 82 feet compared to 76 feet for Vaucluse-Ailey. This study was supported by the Clemson University Creative Inquiry Program.

Poster #100
Soil Inventory of Hester Store Road, Easley, SC
Faculty Mentors: Elena Mikhailova, Christopher Post, Forestry and Natural Resources
Students: Julia Sharp, Emily Burdine

The objectives of this study were to conduct soil inventory of a residential plot in Easley, SC using Web Soil Survey, to collect soil samples from the dove and deer plots, and to analyze collected soil samples for major soil chemical properties and nutrients. Three soil series are found within the property. Cecil and Hiwassee (predominant soil, 67.5%) belong to the soil order of Ultisols. Chewacla belongs to the soil order of Inceptisols. Hiwassee clay loam is a soil of statewide importance and has a yield of corn 90 Bu/ac. Soil nutrient analysis indicated that nutrients are present in medium to sufficient quantities to support dove and deer food plots. Nitrogen should be added to the dove field in quantities of 100 lbs/ac and phosphorus in 80 lbs/ac. In the deer plot, nitrogen should be added in quantities of 100 lbs/ac and phosphorus in 100 lbs/ac. This study was supported by the Clemson University Creative Inquiry Program.

Poster #101
Soil Inventory of a Residential Plot in Little River, SC
Faculty Mentors: Elena Mikhailova, Christopher Post, Forestry and Natural Resources
Students: Julia Sharp, Marissa Vereen

The objectives of this project were to conduct soil inventory of a residential property in Little River, SC using Web Soil Survey. Soil samples were collected and analyzed for soil chemical properties and major nutrients in the in the Clemson University Agricultural Services Laboratory for front and backyard of the property. Three soil series dominate the land: Eulonia, Ogeechee, and Yauhannah, all of which belong to the order of Ultisols. All land is prime farmland or farmland of statewide importance. All soils on the property have a site index of 90 feet. Soil nutrient analyses indicated that all of the soil nutrients were in medium to sufficient quantities, except for manganese (Mn), which appears in low concentrations in the back yard. This study was supported by the Clemson University Creative Inquiry Program

Poster #102
Effects of Rainfall on Tilt at Shallow Depth
Faculty Mentor: Lawrence Murdoch, Environmental Engineering and Earth Science
Students: Duncan Olsen, Davis Hisz, Clay Freeman

The purpose of this study is to assess the effects of rainfall on tilt at shallow depth, in order to better understand the factors that may control this process. The main instruments used were a tiltmeter, and a Clemson University weather station. The tiltmeter recorded tilt magnitude and direction, and the weather station recorded precipitation data. Over one year of tilt and rainfall data was compared and it was found that two separate tilt signals, one normal and one anomalous, are present at our field site, and that the anomalous signal corresponds with rainfall events. Two hypotheses as to the cause of the anomalous tilt, one

addressing Lake Hartwell and one addressing nearby soils, were formed and are currently being tested using numerical models. The discovery of a tilt signal that correlates with rainfall events shows that precipitation may be one of the driving factors behind near surface tilt.

Poster #103
Tilt Signals At Shallow Depth In Saprolite
Faculty Mentor: Lawrence Murdoch, Environmental Engineering and Earth Science
Students: Clay Freeman, Dave Hisz, Maurice Fagan

Subtle atmospheric effects, such as changes in barometric pressure and air temperature, change stresses on the Earth's surface and may cause it to deform. This project uses a high resolution tiltmeter to measure deformation at a site near Pendleton, S.C. Possible deformation mechanisms considered in this project include fluctuations in barometric pressure causing changes in the stress applied to the Earth's surface, differential heating of the Earth's surface causing different amounts of thermal expansion, and changes in soil pore pressure due to the removal of groundwater by vegetation causing soils to contract. The objective of this research is to gain a better understanding of how changes in surface loads affect deformation. Results from this project indicate that tilt signals have a repeated daily pattern: tilting occurs towards the southwest in the mornings and shifts toward the northeast throughout the daytime. Sponsor: Office of Undergraduate Studies at Clemson University: Creative Inquiry Program."

Poster #104
Sediment Transport in Twelve Mile River near Liberty, South Carolina
Faculty Mentor: Lawrence Murdoch, Environmental Engineering and Earth Science
Students: Stuart Wilkins, Will Chamblee, Tyler Waterhouse, Nick Bozzarello, Alex Lefitz, Alexis Jarvis, Ben Douglass, Josh Smith, William Wylie

Twelve Mile River is a small river with a sandy bed located near Liberty, South Carolina. Woodside I, Woodside II, and the dam at Easley/Central Water District are three nearly 10-m-high dams with impoundments that are largely filled with sediment. Woodside I and Woodside II are being removed along with much of the sediment as part of a PCB remediation project. The objective of this study is to evaluate the sediment transport in Twelve-Mile Creek today in an effort to estimate the rate and duration of filling the impoundment behind the dams. The stream hydrograph data were used to determine daily values of stream discharge from 8/1/1954 to 2/27/2011 and then the power-law rating curve was used to estimate sediment load for each day. The filling rate was integrated with time using these data to estimate the sediment depth as a function of time. My research, funded by the Office of Undergraduate Studies at Clemson University, has shown that the time needed for sediment fill to 90% of the total capacity of the impoundment is approximately 20 years.

Poster #105
IEEE SouthEastCon Hardware Team
Faculty Mentor: Stan Birtchfield, Electrical and Computer Engineering
Students: Alan Bartow, Edward Sullivan, Cory Beck, Jesse Mahn, Jessie Santiago, Ryan Izard, Pam Bourque, Austin Pittard, David Jensen

The goal of this project is for a group of undergraduates to develop a small autonomous robot able to navigate through several rooms, avoid obstacles, identify target objects, and announce their locations. This was accomplished through the integration of webcams and other sensors. This work was sponsored by Clemson University.

Poster #106

Student Recruitment in Applied Economics

Faculty Mentors: Kathryn Boys, Molly Espey, Applied Economics and Statistics

Students: Hannah Bagby, Michelle Gottfried

This project will improve understanding of how recruitment efforts influence students' perceptions of applied economics and what strategies are most effective at increasing enrollment in applied economics programs. Universities have consistently produced fewer qualified graduates for positions in applied economics than employment opportunities for more than a decade. Yet attracting students into these fields is hindered by a lack of understanding about the field. Students in this Creative Inquiry project conducted two in-depth interviews regarding college level recruitment and marketing strategies with student services personnel at different institutions. Information from these interviews is used to develop an online survey for nation-wide distribution to recruitment personnel in colleges of agriculture. The Creative Inquiry team will analyze the data and draft a preliminary report of findings. Results of the survey will aid in improving marketing of applied economics programs across the country and strengthen ties between these departments and college-level recruiters.

Poster #107

A Flash of Culinary Tourism: Analysis of Food and Photography

Faculty Mentors: William Norman, Parks, Recreation and Tourism Management, Marge Condrasky, Food Science and Human Nutrition

Students: BingJie Liu, Karen Cuneo, Kate McRae, Sarah Edwards, Brittany Yeargin

Culinary tourism is defined as the pursuit of unique and memorable eating and drinking experiences and is becoming a very popular niche in the world of tourism. There is no better way of remembering your eating and drinking experiences than taking pictures. The culinary tourism CI team along with the help of the Parks, Recreation, and Tourism department have teamed up to find out the who, what, when, where, and why of the art of photography of food and drink. By sending a survey to members of the Flickr group "I Ate This", we examined just how much pictures of food are changing the ways people are traveling.

Poster #108

Student Perceptions of Applied Economics

Faculty Mentors: Kathryn Boys, Molly Espey, Applied Economics and Statistics

Students: Stephanie Dolan, Seth Weaver, Ashleigh Duncan

This project will improve the understanding of student perceptions of agricultural and applied economics as fields of study and careers through analysis of factors influencing choice of major. Over the past decade, universities have produced fewer qualified graduates for positions in applied economics than employment opportunities. Yet lack of understanding about the field as an area of study is an impediment to attracting students into these fields. Several focus groups of undergraduate students were conducted on campus during fall semester. Information gathered from these focus groups was used to develop

an online survey to be administered to high school students throughout the state. The Creative Inquiry team will analyze the data and draft a preliminary report of findings. Results of the survey will be presented at the American Agricultural Economics Association meeting in July 2011 and will aid in improving marketing of applied economics programs across the country.

Poster #109

Moody College Students: Or Is It the Start of the Semester?

Faculty Mentor: June Pilcher, Psychology

Students: Katelyn A. Deacy, Courtney E. Ross, Kristen S. Jennings, Heather M. Weaver

The moods of college students' fluctuate regularly in response to a variety of factors, including the amount of sleep they receive, the amount of stress they are under, and their level of self-acceptance. The main purpose of the study was to examine the stability of self-report mood states during a semester. Fifty students completed the Profile of Mood States (POMS) twice during the first eight weeks of a semester. The participants completed the POMS as part of an electronic set of surveys with approximately 5 weeks between the two assessments. Preliminary analyses indicate that there is an improvement in mood between the first and the second assessment. This indicates that student mood improved during the first half of the semester. The current results suggest that students may experience more positive moods after the initial stress of the start of a semester.

Poster #110

The Influence of Salinity Variation on *Hematodinium sp.* Infection of Blue Crabs in the ACE Basin

Faculty Mentor: Michael Childress, Biological Sciences

Student: Jennifer Micklewright

The number of crabs infected by *Hematodinium*, a deadly parasite, has drastically increased with drought conditions, and there seems to be a positive correlation between the rate of infection in crab populations and rising salinity levels (Parmenter et al. 2010). We measured salinity, crab abundance, and Hematodinium prevalence at 27 locations in the ACE Basin NERR over 11 quarterly samples from June 2008 to December 2010. Crab density and *Hematodinium* infection vary by season and by river. High salinity in September leads to high infection in December, but variation in infection among rivers is not predicted by variation in salinity. Furthermore, crab density in March is negatively related to infection in December. With future work, it is possible our research can be used to predict how such factors will affect blue crab fisheries in upcoming years. Funding was provided by the SC Sea Grant Consortium and the Calhoun Honors College.

Poster #111

Powering Field Monitoring Equipment with Wetland Detritus: From Forest Litter to Electrical Energy

Faculty Mentors: William O'Conner, Alex Chow, Agriculture and Biological Engineering

Students: Elizabeth O'Rourke, William Wilson, Jianing Dai

Powering ecosystem monitoring equipment in wetlands includes trekking over harsh terrain with heavy car batteries. These batteries need to be replaced often and cause quite an inconvenience for researchers. Our research focuses on creating supplementary electrical energy through the decomposition of leaf litter by microorganisms. Microbial fuel cells (MFC), which can convert organic wastes into electricity, are a potential tool to harvest this renewable energy to power field equipment in remote areas. Both batch mode and continuous field MFCs were built and used to evaluate the effects of quantity and composition of the dissolved organic matter on the power output of the MFCs. Electrical outputs have been recorded with

voltmeters in truly anoxic conditions. In conclusion, more research and manipulation of organic matter is needed to produce significant amounts of electricity. Our research could eventually replace batteries in powering field equipment. This project was funded by the EPA P3 contest.

Poster #112
Sleep Habits of College Students: Keep it Clean with Sleep Hygiene
Faculty Mentor: June J. Pilcher, Psychology
Students: Kristin L. Allen, Hannah M. Smith, Amanda L. Padgett, Janelle H. Cheung

According to previous studies, poor sleep hygiene habits are related to poor quality of sleep. The main purpose of the study was to discern if a lecture educating students about the importance of sleep positively affected the sleep hygiene of the students. In the study, the frequencies of different aspects of sleep hygiene were analyzed, such as: regularity of bedtimes, activities before bed, caffeine use, and the usage of the participant's bed. Thirty eight students completed a pre and post Sleep Hygiene Scale to determine whether their sleep hygiene habits improved after the lecture, while fifteen students completed the same survey without attending the lecture. There is little difference between sleep hygiene before and after the sleep lecture. This indicates that a lecture on the importance of sleep did not affect the sleep hygiene habits of college students. College students typically do not have regularity in their sleep patterns.

Poster #113
Small Farm to Big Fork: Demystifying the Procurement Process of Food Served on Campus
Faculty Mentor: Geoff Zehnder, Entomology, Soil and Plant Science
Students: Kate Allison, Brittney Linton, Toni Gomes, Suzette Sharpe, Corrinne Odea

How does the food we eat arrive on our plates at Clemson University? Clemson University dining services provides nearly 70,000 meals a week during the academic year. Currently little to no food, including fresh fruits, vegetables, eggs or meats, produced by this region's small local farmers is making it into those meals. Through this project we will shed light on the process by which the farmers who currently have their products available in the dining halls are able to do this. By demystifying the procurement process for food on campus, we hope to open the lines of discussion on how, if not through the dining halls, can our small local farms benefit from their proximity to the university community.

Poster #114
Reduction of Plutonium Mobility by Natural Organic Matter
Faculty Mentor: Brian Powell, Environmental Engineering and Earth Science
Student: Jennifer Wong

Designing safe disposal and remediation strategies for plutonium requires thorough understanding of plutonium mobility in the presence of natural organic matter (NOM). Complexation with NOM, such as humic and fulvic acids, can drastically alter plutonium mobility; the effects depend on pH, soil type, and type of NOM. Previous studies indicate that humic and fulvic acids have a high affinity for sediments from the Savannah River Site (SRS) at low pH. Flow column experiments with Pu(IV) and SRS sediments confirm that plutonium mobility is reduced relative to a Pu(V) system free of NOM. Greater than 99% of the plutonium was transported less than 2 cm through an 8.3 cm column in the presence of humic acid after passing through greater than 80 column volumes. Plutonium transport was similarly reduced in the presence of fulvic acid. Current strategies

for disposal and remediation may require modification to consider the impact of NOM. Supported by the Department of Energy.

Poster #115
Process Flow Optimization of the Print Plant Color Kitchen: Team 1
Faculty Mentor: Anand Gramopadhye, Industrial Engineering
Students: Jeffrey Tolbert, Brian Persons, Daniel Lewis, Justin Carter, Reshmi Koikkara

In partnership with Milliken & Company, the objective of this capstone design project is to analyze and improve the process flow of material through the Print Plant Color Kitchen (PPCK) of the Milliken & Company – Enterprise Finishing Plant in Marietta, SC. The PPCK is the area in the plant where different chemistries are combined to create a specific dye to be used in the fabric printer. These chemicals are mixed in a very specific order based on the product which is being produced and consists of different stages. The current system was analyzed using various Industrial Engineering tools. The team focused on developing a facility layout and a design of Print Plant Color Kitchen utilizing Lean methodology to minimize non-value added material handling and improve on the current flow of materials with provisions for incorporating a second print range in the future.

Poster #116
Process Flow Optimization of the Print Plant Color Kitchen: Team 2
Faculty Mentor: Anand Gramopadhye, Industrial Engineering
Students: Richard Pinckney, Richard Mullet, Dana Goodfellow, Scott Eisenbrown, Reshmi Koikkara

In partnership with Milliken & Company, the objective of this capstone design project is to analyze and improve the process flow of material through the Print Plant Color Kitchen (PPCK) of the Milliken & Company – Enterprise Finishing Plant in Marietta, SC. The PPCK is the area in the plant where different chemistries are combined to create a specific dye to be used in the fabric printer. These chemicals are mixed in a very specific order based on the product which is being produced and consists of different stages. The current system was analyzed using various Industrial Engineering tools. The team focused on developing a facility layout and a design of Print Plant Color Kitchen utilizing Lean methodology to minimize non-value added material handling and improve on the current flow of materials with provisions for incorporating a second print range in the future

Poster #117
What Academic Integrity Means to YOU: Student perceptions and Motivations
Faculty Mentor: Teddi Fishman, Rutland Institute for Ethics
Students: Kaitlyn Parton, Katrina Pride, Stephanie Grider, LeeAnne GoForth

At a time when public lapses in integrity appear in the news almost daily, we wanted to learn more about Clemson students' perceptions of the significance of integrity in their academic lives. Using a survey, focus groups, and interviews, this project's aim is to find out where students stand and what their questions are, then address their issues with a video (or videos) that talks about what they need to know about academic integrity. Our poster presentation will feature survey results and quotes that give insight to the academic integrity climate on our campus.

Poster #118

Route Optimization for Waste Collection: Team1

Faculty Mentor: Anand Gramopadhye, Industrial Engineering

Students: Carla Shields, Alexander Padgett, Rohan Aggarwal, Achieng Adongo, Reshmi Koikkara

In partnership with Milliken & Company, the objective of this capstone design project is to improve the current waste collection process at the Milliken Excelsior plant in Pendleton, S C. The wastes in the plant include fabric as well as recycled plastic, cardboard tubes and paper. The existing waste collection procedure of the plant is not standardized and needs to be optimized. Various Industrial Engineering tools were used to evaluate the current process. Product specifications for the process were used to generate different concepts for the waste collection routes. The team then analyzed each of the concepts and arrived at an optimal route that will help the waste collection associates reduce walking time, time spent doubling back and separating different waste types, time spent at the baler, and time spent filling the waste collection form.

Poster #119

Route Optimization for Waste Collection: Team 2

Faculty Mentor: Anand Gramopadhye, Industrial Engineering

Students: Michael Steadings, Tyler Martin, Sarah Beckius, Jonathan Bacaoat, Reshmi Koikkara

In partnership with Milliken & Company, the objective of this capstone design project is to improve the current waste collection process at the Milliken Excelsior plant in Pendleton, S C. The wastes in the plant include fabric as well as recycled plastic, cardboard tubes and paper. The existing waste collection procedure of the plant is not standardized and needs to be optimized. Various Industrial Engineering tools were used to evaluate the current process. Product specifications for the process were used to generate different concepts for the waste collection routes. The team then analyzed each of the concepts using ARENA simulation and arrived at an optimal route that will help the waste collection associates reduce walking time, time spent doubling back and separating different waste types, time spent at the baler, and time spent filling the waste collection form.

Poster #120

Ergonomic Assessments for Schneider Electric Pressing Process

Faculty Mentor: Anand Gramopadhye, Industrial Engineering

Students: Hunter Wilson, France Jackson, Nicholas Anos, Yuan-Han Huang

This study focuses on reducing ergonomic stains associated with the press brake process at Schneider Electric Seneca. A systematical task analysis (TA) was conducted to analyze the pressing process. Rapid Upper Limb Assessment (RULA) and Rapid Entire Body Assessment (REBA) were used to evaluate the awkward postures within each task. Results showed that workers have awkward postures with a risk of injury (RULA=6; REBA>7) in: placing a finished part on the pallets and picking up a part from low level platforms (< 12 inches). Furthermore, the overweight (> 40 lbs) material handling without any lifting assist was observed on the site as well. According to the findings, the design team provided a series of ergonomic interventions to reduce the physical strains for part pullers with all ergonomic suggestions meeting the Schneider Electric safety standards.

Poster #121

Media and the Obesity Epidemic: The Association Between National Declarations of Health Epidemics and News Media Coverage of Health

Faculty Mentor: Ellen Grandberg, Sociology
Students: Elizabeth Ficklin, Margaret Leisey

Question: How do national declarations regarding health affect related news media coverage? Purpose: To assess evidence that declaration of an obesity epidemic has an effect on media coverage of obesity as a health issue. Method: 200 articles containing the words "obese" "obesity" "corpulent" or "corpulence" were randomly selected from the New York Times archive. Articles focusing on obesity as a social or health issue were measured as a proportion of all articles mentioning these key words. The proportion of articles written per year was assessed to determine if coverage of obesity as a social and health issue increased after 1-1-1999, when the epidemic was declared. Conclusion: More articles were published regarding obesity's causes and consequences after the 1999 declaration, although there has been a steady rise in related articles since 1940 warranting further investigation. Value: This can help determine effective ways to raise obesity awareness.

Poster #122

Hurricane Prediction Visualization

Faculty Mentors: Donald House, Michael Lindell, School of Computing
Student: Jonathan Cox

One of the primary tools in showing a hurricane's possible path is the error cone. It displays the hurricane in a cone that represents a sixty percent chance of the likely track of the hurricane. This method gives the impression to those inside the cone that they have an exaggerated chance of being in the hurricane's path, while those outside of the cone feel a false sense of security. We have developed a new method of visualizing the possible projected paths of hurricanes using the current predicted path of a given hurricane as well as historical data of previous hurricane paths that dates back to 1851. The goal is to maintain a display that shows a wide range of possible outcomes, while maintaining the statistical characteristics of the cone of uncertainty. To show the wide variety of hurricane paths consistent with the predicted path, we rapidly and continuously generate a set of representative paths. While the foundation of our algorithm is in place, we are still working on a model that will maintain the statistical distribution provided by the error cone. We hope that our model will give individuals who make evacuation decisions a better understanding of the actual probability of a hurricane's path.

Poster #123

Package Development for Innovative Food Products

Faculty Mentor: Andrew Hurley, Packaging Science
Students: Steven Bond, Allison Littman, Josh Galvarino, Natalie Quin

This is a group of specialized packaging students assembled to develop new packaging systems for innovated food products. The entire developmental work flow was considered. Initiating with concept design, material selection, structural design, graphic design and concluding with production quality prototypes.

Poster #124

HEHD 199 - Creative Inquiry - Creating a Healthy Campus through Wellness Services for freshman students at Clemson University

Faculty Mentors: Karen Kemper, Public Health Sciences, Susan Pope, Campus Recreation
Students: Michelle Steele, Julie Weigand, Lindsay Schwartz, Julie Schwab, Amy Petrilli, Kylie Cribb, Chelsea Fleming, Harrison Luttrell

This CI objective is to identify whether students needs are being met through current campus wellness resources. Wellness encompasses physical activity, nutrition, environmental, social, emotional, and spiritual components. The group began Fall 2010 by identifying and learning how these components relate to their personal well being. The NCHA as well as an additional survey through Student Voice were used to identify specific areas as they relate to current student issues. The CI group developed a strategic timeline with benchmarks in order to implement various phases of a wellness program for students at CU which include: developing a website that will provide links to various departments and services, fitness assessments for all freshmen and an electronic tracking of participation in healthy choice programs and services rewarded by external incentives. The value of this project is providing a one stop shop with information on the resources available to Clemson students.

Poster #125

Assessing Society Based Outreach To University Level and Middle School Students

Faculty Mentors: Julie Trenor, Engineering and Science Education, Marian Kennedy, Materials Science and Engineering
Students: Sarah Kendrick, Mitchell Fanning, Lindsay Mullenix

What are the perceptions of middle school students about the efficacy of the ASM Radio podcasts, and what is the effectiveness of the podcasts in improving the attitudes of teachers and the reactions of students to the podcasts? The motivation for this study is to examine this unique outreach program that uses college students as a medium to communicate with middle school students and to determine whether there is room for improvement in the this program. The methodology includes creating a survey to distribute to the sample set of teachers using the ASM Foundation database. The survey will measure the perceptions of the teachers about the podcast program, supply them with podcasts to which they can listen, and then measure their perceptions after listening to the podcasts. Personal interviews with individuals will be arranged and conducted based on the answers from the survey. This study is a work in progress.

Poster #126

New Microsatellite Loci for the Endemic Hawaiian Goby *Sicyopterus stimpsoni*

Faculty Mentors: Margaret Ptacek, Biological Sciences
Students: Sabrina Hunter, Hannah Warren, Kristine Moody

Using neutral microsatellite DNA markers, we investigated the degree of population genetic differentiation in Sicyopterus stimpsoni from two Hawaiian Islands. Such molecular markers are useful in investigating whether natural selection can favor local adaptation in response to different environments despite gene flow between islands. We tested 10 microsatellite loci on 91 individuals of *S. stimpsoni* from Hawai'i and Kaua'i and found the average number of alleles per locus ranged from 27 to 61 and observed heterozygosity ranged from 0.352 to 0.937. Shared alleles were found between island subpopulations, however, private alleles were also found, suggesting some degree of population differentiation between islands. The large number of island-specific alleles suggests that partial barriers to gene flow exist between subpopulations, favoring local adaptation in behavior and morphology. These markers will inform future research for the preservation of these endemic Hawaiian fish threatened by human disturbance of freshwater habitats and severe population declines.

Poster #127

Reasons for Initiation, Maintenance, and Cessation of Deliberate Self-Harm: Social and Emotion Regulation Functions

Faculty Mentor: Heidi Zinzow, Psychology

Students: Megan Hunsberger, Stephanie Freeman, Alexa Taylor, Brandon Norvelle, Holly O'Neil

The purpose of the current study was to delineate and compare reasons for initiation, maintenance, and cessation of deliberate self-harm (DSH). A sample of 496 undergraduate participants completed self-report questionnaires assessing DSH behaviors. Exploratory factor analysis on reasons for initiating DSH revealed 4 factors: Anger, Stress, Communication and Emotion Regulation. Related samples McNemar's tests found that participants were less likely to report anger and stress as DSH reasons on most recent incidents as opposed to first incidents; rates of communication and emotion regulation reasons remained the same. Participants most frequently reported engaging in DSH for emotion regulation reasons, as opposed to social reasons. The most frequent reason for cessation was finding other ways to cope with feelings. Findings suggest that efforts to reduce DSH should focus on improving emotion regulation skills, and that interventions may differ depending on whether they are focused on prevention versus secondary intervention.

Poster #128

Characterization of Microsatellites in the Endemic Amphidromous Fish *Stenogobius hawaiiensis* in the Hawaiian Islands.

Faculty Mentor: Margaret Ptacek, Biological Sciences

Students: Hannah Warren, Sabrina Hunter, Kristine Moody

Hawaiian goby fishes use both morphological and behavioral adaptations to escape predators in freshwater stream habitats. By using neutral genetic DNA markers, we can investigate the degree to which population genetic differentiation occurs in the goby *Stenogobius hawaiiensis* and better understand how local adaptations can evolve in the face of gene flow. We isolated seven microsatellite loci for *S. hawaiiensis* and tested them on 100 individuals. Each locus showed moderate to high levels of allelic diversity (21 to 52 alleles/locus; mean = 34) and observed levels of heterozygosity ranged from 0.494 to 0.911. Five loci showed deviations from Hardy-Weinberg equilibrium, most likely from heterozygote deficiencies or null alleles. These primers will be useful for further studies into the roles of genetic drift shaping population structure and natural selection shaping morphological and behavioral adaptations. Genetic information will also help to inform conservation strategies in management of these unique Hawaiian fishes.

Poster #129

Soil Inventory of Travelers Rest Circle, Easton, MD

Faculty Mentor: Elena Mikhailova, Forestry and Natural Resources

Student: Jurriuss Ryan

The objectives of this study were to conduct soil inventory of a residential plot in Easton, MD using Web Soil Survey, and to develop a soil management plan. Five soil series are found within the property. Hambrook-Sassafras (predominant, 57.8% of AOI), Mattapax, Othello belong to the soil order of Ultisols. Transquaking and Mispillion belong to the soil order of Histosols. Hambrook-Sassafras complex has the best suitability ratings in most categories (except for septic suitability), and it occupies the largest area of the property. Transquaking and Mispillion soils have the worst suitability ratings in all categories, and it occupies the smallest area of the property. Mattapax silt loam occupied the second most area, it suitable for crops but not basements or septic. Othello silt loam is not suitable for crops, basements or septic. This study was supported by the Clemson University Creative Inquiry Program.

Poster #130
Soil Inventory of Holiday Dam Rd., Belton, SC
Faculty Mentors: Elena Mikhailova, Christopher Post, Forestry and Natural Resources
Students: Julia Sharp, Samual Patterson

The objectives of this study were to conduct soil inventory of a residential plot in Belton, SC using Web Soil Survey, to collect soil samples from the dove and deer plots, and to analyze collected soil samples for major soil chemical properties and nutrients. Three soil series are found within the property: Pacolet, Cecil and Hiwassee, all of which belong to the soil order of Ultisols. Soil nutrient analysis indicated that nutrients are present in medium to sufficient quantities to support dove and deer food plots. Dove field and deer plot are both located in the prime farmland areas. Nitrogen should be added to the dove field in quantities of 100 lbs/ac and phosphorus in 50 lbs/ac. In the deer plot, phosphorus should be added in quantities of 100 lbs/ac and potassium in 25 lbs/ac. This study was supported by the Clemson University Creative Inquiry Program.

Poster #131
Cognitive Appraisals of Courage
Faculty Mentor: Cynthia Pury, Psychology
Students: Danielle Gallant, Maurice Abrams, Blake Adams, Matt Burling, Danielle Butts, Jason Crews, Katie Hamilton, Marlon Johnson, Arden Lowndes, Natalie Plaehn, Scottie Whiteley

We present a series of interconnected projects testing a cognitive appraisal model of courage. One set of studies test how well the model predicts courageous actions, including a laboratory-based measure of courage using a modified cold pressor task. We are interested in connecting courage and what it is defined as in the workplace, as well as with children, in particular the Girl Scouts. We are testing how well the model predicts perceived courageousness based on risks and outcomes and in situations where someone believe they are acting with courage although they are acting against societal norms. Finally, we are laying the groundwork for examining the role of situation and observer mood on courage. We are attempting to discover the underlying taxonomy of situations using multidimensional scaling, and we are developing a measure of state elevation, a human reaction to seeing other people do things that are morally beautiful.

Poster #132
Soil Inventory of Two Residential Properties in Columbia, SC
Faculty Mentors: Elena Mikhailova, Christopher Post, Forestry and Natural Resources
Student: Latoisha Green, Julia Sharp

The objectives of this study were to conduct soil inventory of two residential plots in Columbia, SC using Web Soil Survey. Soil samples were collected and analyzed for soil chemical properties and major nutrients in the Clemson University Agricultural Services Laboratory for the garden plots located on one of the properties. One of the residential properties is occupied by Fuquay sand, and the second property is occupied by Lakeland-Urban land complex. Fuquay belongs to the soil order of Ultisols and Lakeland-urban land complex belongs to the soil order of Entisols. Fuquay had the best rating for

dwellings with basements, septic tank absorption fields, and farmland classification. Lakeland-urban land complex did not have high ratings for any of the tested potential uses. The garden plots are located on Fuquay sand with major soil nutrients in sufficient to excessive quantities. This study was supported by the Clemson University Creative Inquiry Program.

Poster #133
Healthy Cooking Techniques Creative Inquiry ClemsonLIFE Postsecondary Transition
Faculty Mentor: Sharon Sanders, Teacher Education
Student: Corey McCarthy

A recent study published in Nutrition Journal (Wengreen & Moncur, 2009) found that almost 25% of students gained an average of 5% of their body weight during their freshman year in college. The researchers concluded the transition from high school to college promotes changes in behavior and environment that may produce weight gain. Another population that is subject to weight gain and poor nutrition is people with intellectual disabilities. The ClemsonLIFE Postsecondary Transition Program is a transition program located on a college campus and, therefore, produces a union of these two at-risk groups: young adults with intellectual disabilities and college freshman transitioning out of high school. The Healthy Lifestyle Creative Inquiry section for ClemsonLIFE explores issues related to a healthy lifestyle and presents instruction on healthy cooking techniques, food safety, and recipe substitutions. This session presents pre and post-assessment data indicating that instruction in these areas did increase these students' knowledge of healthy cooking and nutrition which could contribute to a healthier independent lifestyle.

Poster #134
Soil Inventory of a HWY 9 West, Wallace, SC
Faculty Mentors: Elena Mikhailova, Christopher Post, Forestry and Natural Resources
Student: Stephen Bryant, Julia Sharp

The objectives of this study were to conduct soil inventory of a residential plot in Wallace, SC using Web Soil Survey, to collect soil samples from the garden, and to analyze collected soil samples for major soil chemical properties. Two soil series are found within the property: Cowarts and Emporia, all of which belong to the soil order of Ultisols. The dominant soil type present was Emporia loamy sand, 2 to 6 percent slopes (fine-loamy, siliceous, subactive, thermic Typic Hapludults). Cowarts is not a prime soil and Emporia is a prime soil. Collected samples were all from the Emporia soil type. Each soil sample had different levels of the plant nutrients. Each sample had similar cation exchange capacity (CEC) and acidity. Soil nutrient analysis recommendations are discussed to maximize agricultural productivity and minimize environmental impact. This study was supported by the Clemson University Creative Inquiry Program.

Poster #135
Soil Inventory of Aston Farm, Latta, SC
Faculty Mentors: Elena Mikhailova, Christopher Post, Forestry and Natural Resources
Students: Julia Sharp, Aston Player

The objectives of this study were to conduct soil inventory of a residential plot in Latta, SC using Web Soil Survey, to collect soil samples (Food Plot 1 and 2), and to analyze collected soil samples for major soil chemical properties and nutrients. The dominant soil type is Smithboro loam, 0 to 10 percent slopes (Fine, kaolinitic, thermic, Aeric Paleaquults). The other type of

soil found on the farm is Coxville (Fine, kaolinitic, thermic Typic Paleaquults). According to the soil analysis laboratory results, fertilizer additions are needed in both food plots 1 and 2 in order to plant fall forage for deer and other wild game species. There is sufficient nitrogen in the soil for planting. In terms of liming, about 16,200 lbs of lime are needed to raise the soil pH to a target pH of 6.0. This study was supported by the Clemson University Creative Inquiry Program.

Poster #136
Surface Modified Mechanical Heart Valves Support Endothelial Cell Adhesion
Faculty Mentors: Dan Simionescu, Bioengineering, Jiro Nagatomi, Bioengineering
Students: Daniel Spence, Laine Shaw, Katie Miller, Ryan Poole

Mechanical heart valves are often chosen for valve replacement surgery due to their long term durability. Unfortunately they lack the hemocompatibility of biological valves, so they require a lifetime anticoagulant regime to reduce the risk of thrombus formation. Endothelial cells maintain non-thrombogenic surfaces in the vasculature. Our team aimed to modify the surface of a mechanical heart valve to create a more hemocompatible surface by adhering autologous endothelial cells to the surface. We modified the surfaces of mechanical valves using plasma generation to create free radicals, applied a collagen scaffold, and seeded endothelial cells. Mechanical conditioning of the cell-seeded valves in a bioreactor tested for cell retention and viability under simulated physiological conditions as compared to static controls at day 1 and day 7. Results showed excellent viability, retention, and morphology consistent with native endothelial cells. These results show promise for a hemocompatible mechanical valve, eliminating the need for anticoagulants.

Poster #137
The Effects of Achievement Grouping in the Elementary Classroom
Faculty Mentor: Mindy Spearman, Teacher Education
Student: April Steele

This study is designed to evaluate the effects of achievement grouping in the elementary classroom. The study is to determine how the students feel about being placed into an advanced level class while most of their peers are in other classes. This will help determine how the students' academic behavior affects their social behaviors in and outside of the classroom. At the conclusion of the study, we plan to submit a manuscript detailing the project to an academic journal.

Poster #138
Reducing High Risk Drinking Among First Year College Students
Faculty Mentor: Hugh Spitler, Public Health Science
Students: Kristen Kaps, Kristy Schweighardt, Amy Morrison

Dr. Hugh Spitler sponsored our research to develop focus groups in order to understand the factors that contribute to high risk drinking and alcohol abuse among freshmen students at Clemson University. Creating and studying these focus groups is important because of the high rates of binge drinking reported among college students. The focus group sessions consisted of 5-10 freshman students led by 2 facilitators. The sessions lasted approximately 1 hour. The atmosphere allowed for open and honest discussions about alcohol use. Students shared their opinions and experiences of the factors contributing to high-risk alcohol use. The focus group sessions were recorded and later analyzed. Incentives were given to students who participated. Our results concluded that social and environmental factors specific to the college atmosphere greatly influence freshman alcohol

intake. The participants' opinions and shared experiences will help educators to develop programs aiming to reduce the risks and negative consequences of drinking.

Poster #139
Public Opinion on Balloon Releases from Clemson Football Games
Faculty Mentor: Stephan Irwin, Biological Sciences
Students: Eric Holberton, Elaine Donithan, Callen Bethea, Cyrus Baird

The goal for this study was gather opinions from football game attendees at Clemson about balloon releases. The different areas of emphasis of the surveys included demographics, environmental importance, appeal of the day's activities. Surveys were complied, given to 190 people containing 15 questions results were; 2% of people surveyed said that the number one enjoyment from the Clemson football games were the balloons. One of the questions asked the interviewee the estimated distance a balloon released at a game will travel, the average estimated was 187.26 miles. However, the balloons were capable of traveling over 250 miles shown by our balloon investigation. 42% of those surveyed believed that the balloons released could be detrimental to the environment. While some data has been collected, true results are still unknown and still being researched. Further research is being conducted this semester about the affects of wildlife from the latex in balloons.

Poster #140
Atmospheric Effects on Integrity and Dispersal of Latex Balloons
Faculty Mentor: Stephan Irwin, Biological Sciences
Students: Tim O'Neill, Beau Bauer

Environmental concerns have called into question the Clemson University (CU) tradition of releasing balloons during home football games. Of concern is the possibility of balloons traveling to coastal regions and adversely affecting marine life (van Franeker 2008, Lucas 1992). Previous studies suggest that latex balloons ascend to a certain altitude, brittle fracture, return to earth, and quickly biodegrade (Burchette 1989). In order to address these concerns; balloons fitted with research tags and inflated balloons attached to a weather balloon were released. Brittle fracture was not expected to occur; however, it was estimated that balloons released from CU could travel to nearby coasts. The furthest reported tagged balloon traveled 278 miles. Specimens from the weather balloon exhibited brittle fracture. Data suggest the potential for balloons released from CU to achieve coastal dispersion in a condition that could affect wildlife.
Works Cited:
Burchette DK. 1989. A study on the effect of balloon releases on the environment.
van Franeker JA. 2008. Balloons as marine litter. Sula 21(1): 44-46.
Lucas Z. 1992. Monitoring persistent litter in the marine-environment on Sable-Island, Nova-Scotia. Marine Pollution Bulletin 24(4): 192-199.

Poster #141
Thermal Neutron Detection by Boron Coated Cantilever using Harmonic Detection of Resonance
Faculty Mentor: Apparao Rao, Physics and Astronomy
Student: Deepika Saini

Neutron detection is an essential aspect of interdiction of nuclear threats for the homeland security. We design a thermal neutron detector using a silicon cantilever coated with boron and tested it by means of Harmonic Detection of Resonance (HDR), a capacitive detection method. The detection is based on the capture of a neutron by the Boron-10. Our device

showed a significant frequency downshift of 0.75Hz/m, during 1- 4 mrem/hr thermal neutron exposure. Also, 100nm thick B-coated microcantilever exhibited no response to exposure to 5μcurie of gamma radiation, indicating excellent gamma-neutron discrimination. We attribute the frequency decrease to a decrease in the effective spring constant due to bending. The device will serve as an easy and reliable method to keep vigilance on potential threats on the nation. We acknowledge Dr. Steven M. Serkiz, Savannah River National Laboratory, for his support in the project.

Poster #142

A Combined Numerical and Experimental Approach to Measuring Gap Conductance for Precision Glass Molding

Faculty Mentors: Kathleen Richardson, Materials Science and Engineering, Peiman Mosaddegh, Mechanical Engineering, David Musgraves, Materials Science and Engineering
Students: Christopher Ostrouchov, Joshiand Dhananjay

A realistic Finite Element simulation of the Precision Glass Molding (PGM) process requires knowledge of the heat flux between the glass and the mold material; one major source of error in these models is the lack of experimentally verified data on the gap conductance between the glass and mold. In the present work, experimental gap conductance measurements have been carried out using a commercial glass molding machine under conditions similar to those found in industrial precision glass molding processes. In addition, a 3D ABAQUS model is implemented to simulate the experimental results. Both the experimental and simulation-based results show that the heat transfer at the interface of the glass and mold depends upon the thermal conductivity of metal, the gap conductance of the glass/mold interface, the level of the applied normal force, and the surface roughness of the mold material. The experimental and simulation-based results are not identical, but show a significant correlation. The value of the gap conductance is in the range of 250 to 150 W/m °C for a gap distance of 0.1 to 1 mm in the experimental tests when all other parameters are held constant.

Poster #143

Student Learning Via a General Education ePortfolio: Does It Occur and How Can It Be Enhanced?

Faculty Mentors: Benjamin Stephens, Nathan Klein, Psychology
Students: Julie Birchbickler, Shelvia Maynard

Several educators have argued that ePortfolios can provide an authentic and evidence-based assessment system (e.g. Banta, 2002; Stephens and Weaver, 2005; Yancey, 2004). Additionally, the ePortfolio may be an effective tool for deeper learning. The first study examines the impact of completing the social sciences portion of the general education ePortfolio on student competency in this area. Completing an ePortfolio assignment did not result in greater social science competency compared to those who did not complete an ePortfolio assignment. The second study was designed to test a way to enhance the effectiveness of the ePortfolio at improving student competency. Students experienced three different types of instruction: Student centered, benchmarked, and no instruction. The type of instruction provided was found to have an impact on the social science competency of the student. These results indicate that with out instructional support that specifically addresses the competency domains, students do not experience learning benefits from completing their ePortfolio.

Poster #144

Development of an Automotive Headlight using Metal Foam and LEDs

Faculty Mentor: Joshua Summers, Mechanical Engineering

Students: Tim Hess, Mark Bowman, Freddy DeAngelis, Apurva Patel, Beshoy Morkos

The purpose of this project is to investigate the feasibility of using high-power LEDs and metal foam heat sinks to reduce the mass, volume, and energy consumption of automotive headlights. The construction of a prototype headlight is presented, as well as test results used to help characterize the airflow and heat transfer characteristics of the metal foams. The effects of pore size, relative density, material, and thickness were all tested, with material thickness having the largest effect on flow loss. Wind tunnel testing of the prototype revealed that a wind speed of 6.0m/s (13.4 mph) perpendicular to the LED array cooled the LEDs to a steady state temperature of 29°C, well below the maximum allowable temperature of 90°C. These initial results indicate that the metal foams can effectively cool high-power LEDs with airflow created from a slow moving vehicle, potentially reducing the weight and complexity of an automotive headlight.

Poster #145

Effects of Growth Factor Concentration Gradients on Cells in Culture

Faculty Mentor: Dephine Dean, Bioengineering

Students: Katie Miller, Amana Ngeyen, Aesha Desai

Growth factors can increase cell growth and proliferation. Neurons are very sensitive to specific growth factors and chemical gradients, allowing them to grow in specific directions. The goal of this study was to build soluble and immobilized growth factor concentration gradients with well established profiles for 2D cell culture studies. To create soluble growth factor concentration gradients, growth factor reservoirs were built using alginate. The glass coverslips were treated with 3-aminopropyltriethoxy silane (APTES), DTSSP, and Nerve Growth Factor (NGF). Neurons obtained from the forebrain of seven day chicken embryos were cultured in media. The direction of growth was then observed. After plating neurons were monitored at 2, 24, and 48 hours of growth. Neurons were found to have grown neurite extensions within 48 hours and growth rate increased with increasing NGF concentration. This data will be compared to modeled neuron growth, which is used for repairing spinal cord injuries.

Sponsor: the Clemson University SC Life program, with support from the Howard Hughes Medical Institute

Poster #146

The Effects of Cyber-Sexual Harassment on Task Performance

Faculty Mentor: Robin Kowalski, Psychology

Students: Kirsten Neilson, Samantha Jefferson, Lauren Carroll, Suzannah Isgett, Gary Giumetti, Jessica Doll

To date, the link between cyber-sexual harassment and task performance has not been examined. The current study manipulates two levels of the independent variable (receiving sexually harassing statements with tasks vs. receiving neutral statements with tasks) in a within-subjects experimental design. Task performance is the dependent variable. Biological data (i.e., heart rate information) will also be collected. Undergraduate psychology students will complete the study by receiving e-mails that include tasks which will be completed in a simulated work environment. Data is currently being collected. We hope that this research will demonstrate the effect of cyber-sexual harassment on task performance.

Poster #147
Lunar Sand Traction
Faculty Mentors: Joshua Summers, James Mathieson, Mechanical Engineering
Students: Dominic Gibbs, Tyler Curran, Adam Matyi-Sazbo, Zach Satterfield, Lin Han, Craig Shuman, Matt Thompson, Greg Olsen, Heather Satterfield, Elizabeth Krause, Celine Sunga

The purposes of the tire designs were to increase traction on a sandy surface, and these designs are to be used on lunar rovers. Three groups had to create tire traction concepts. The tire concepts had to be designed, built and then tested in the merry-go-round. Data had to be collected for varying heights, speeds, and loads. The best tire designs utilized a layer of foam over the tire, treating the sandy surface like a liquid. The foam compressed while the tire rotated, which increased the tire's surface area. In order to increase traction, the groups had to increase the tire's surface area. These tire designs could potentially be recreated for future concepts and experiments, which would be applied to tires of lunar rovers.

Poster #148
Soil Inventory of Lakewood Drive, Spartanburg, SC
Faculty Mentors: Elena Mikhailova, Christopher Post, Forestry and Natural Resources
Students: Julia Sharp, Richard Stone

The objectives of this study were to conduct soil inventory of a residential plot in Spartanburg, SC using Web Soil Survey to develop a soil management plan. The soil series found within the property is Pacolet sandy loam (Fine, kaolinitic, thermic Typic Kanhapludults), which belongs to the soil order of Ultisols. Pacolet sandy loam is not prime farmland. Pacolet sandy loam is suited for loblolly pine (*Pinus taeda L.)* with a rating of 78 feet. According to the soil analysis laboratory results, fertilizer additions are needed for shrubs: 120 lbs/acre for N, 120 lbs/acre of P2O5 and 100 lbs/acre of K2O. This study was supported by the Clemson University Creative Inquiry Program.

Poster #149
Soil Inventory of Murray Court, Aiken, SC
Faculty Mentor: Elena Mikhailova, Forestry and Natural Resources
Student: Scott Hunter

The objectives of this study were to conduct soil inventory of a residential plot in Aiken, SC using Web Soil Survey to develop a soil management plan. The soil series found within the property is Troup (Loamy, kaolinitic, thermic Grossarenic Kandiudults), which belongs to the soil order of Ultisols. Troup is not prime farmland. Troup has somewhat limited in terms of suitability for dwellings with basements. Troup is suited for loblolly pine (*Pinus taeda L.*) with a rating of 82 feet. This study was supported by the Clemson University Creative Inquiry Program.

Poster #150
Soil Inventory of Gayles Road, Middlesex, VA
Faculty Mentor: Elena Mikhailova, Forestry and Natural Resources
Student: Parker Sharpe

The objectives of this study were to conduct soil inventory of a residential plot in Middlesex, VA using Web Soil Survey to develop a soil management plan. The soil series found within the property is Kempsville (Fine-loamy, siliceous, subactive, thermic Typic Hapludults), which belongs to the soil order of Ultisols. Kempsville sandy loam is prime farmland. Kempsville is not limited in terms of suitability for dwellings with basements, lawns, landscaping, and golf fairways. Kempsville is somewhat limited for septic tank absorption fields due to slow water movement. Kempsville sandy loam is suited for loblolly pine (*Pinus taeda L.)* with a rating of 82 feet. This study was supported by the Clemson University Creative Inquiry Program.

Poster #151
Soil Inventory of Briar Patch Lane, Warrenville, SC
Faculty Mentor: Elena Mikhailova, Christopher Post, Forestry and Natural Resources
Student: Krista McCuen, Julia Sharp

The objectives of this study were to conduct soil inventory of a residential plot in Warrenville, SC using Web Soil Survey, to collect soil samples (garden and forested areas), and to analyze collected soil samples for major soil chemical properties and nutrients. There are four soil types within the property. Dominant soil type is Fuquay sand, 2 to 6 percent slopes (Loamy, kaolinitic, thermic, Arenic Plinthic Kandiudults). All soils belong to the order of Ultisols. Most of the property is prime farmland or farmland of statewide importance. According to the soil analysis laboratory results, fertilizer additions are needed in the forested area for wildlife food plot: 30 lbs/acre for N, 100 lbs/acre of P_2O_5 and 100 lbs/acre of K_2O. There are no fertilizer or lime additions necessary for the garden plot. This study was supported by the Clemson University Creative Inquiry Program.

Poster #152
Soil Inventory of Aston Farm, Latta, SC
Faculty Mentors: Irena Mikhailova, Christopher Post, Forestry and Natural Resources
Students: Player Aston

The objectives of this study were to conduct soil inventory of a residential plot in Latta, SC using Web Soil Survey, to collect soil samples (Food Plot 1 and 2), and to analyze collected soil samples for major soil chemical properties and nutrients. The dominant soil type is Smithboro loam, 0 to 10 percent slopes (Fine, kaolinitic, thermic, Aeric Paleaquults). The other type of soil found on the farm is Coxville (Fine, kaolinitic, thermic Typic Paleaquults). According to the soil analysis laboratory results, fertilizer additions are needed in both food plots 1 and 2 in order to plant fall forage for deer and other wild game species. There is sufficient nitrogen in the soil for planting. In terms of liming, about 16,200 lbs of lime are needed to raise the soil pH to a target pH of 6.0. This study was supported by the Clemson University Creative Inquiry Program.

Poster #153

Soil Inventory of Arlington Heights, Seneca, SC

Faculty Mentors: Elena Mikhailova, Christopher Post, Forestry and Natural Resources
Students: Julia Sharp, Evan Kaiser

The objectives of this study were to conduct soil inventory of a residential plot in Seneca, SC using Web Soil Survey, Clemson Unviersity Agricultural Service Laboratory, and to develop a soil management plan. The soil series found within the property is Cecil (Fine, kaolinitic, thermic Typic Kanhapludults), which belongs to the soil order of Ultisols. Cecil is not prime farmland. Cecil is somewhat limited to very limited in terms of suitability for dwellings with basements and for septic tank absorption fields. Cecil sandy loam is better suited for loblolly pine (*Pinus taeda L.*) with a rating of 78 feet compared to 70-72 feet for Cecil clay loam. Soil nutrient analysis results and recommendations are discussed with regards to land and soil management. This study was supported by the Clemson University Creative Inquiry Program.

Poster #154

Soil Inventory of Telegraph Road, Elkton, MD

Faculty Mentors: Elena Mikhailova, Christopher Post, Forestry and Natural Resources
Students: Julieann Prettyman, Julia Sharp

The objectives of this study were to conduct soil inventory of a residential plot in Elkton, MD using Web Soil Survey, and to develop soil management plan. The dominant soil type is Montalto silt loam, 8 to 15 percent slopes (Fine, mixed, semiactive, mesic Ultic Hapludalfs). The other type of soil found on the property is Glenelg loam (Fine-loamy, mixed semiactive, mesic Typic Hapludults). Glenelg loam is not very limited in terms of basement suitability. Both soils are somewhat limited for septic tank absorption field suitability. The Montalto silt loam, however, is very limited in terms of basement suitability. Glenelg loam is prime farmland. Montalto silt loam is farmland of statewide importance. This study was supported by the Clemson University Creative Inquiry Program.

Poster #155

Soil Inventory of Rutledge Lake Road, Greenville, SC

Faculty Mentors: Elena Mikhailova, Christopher Post, Forestry and Natural Resources
Students: Julia Sharp, Matthew May

The objectives of this study were to conduct soil inventory of a farm in Greenville, SC using Web Soil Survey, and to develop a soil management plan. Six soil series are found within the property. Four soil series belong to the soil order of Ultisols with Pacolet being a predominant soil (28% of AOI). One soil series belongs to the soil order of Entisols, and another one belongs to the soil order of Inceptisols. Cartecay and Chewacla are prime farmland if drained, Cartecay-Taccoa complex, and Hiwassee sandy loam (6-10% slopes) are farmland of statewide importance. Cartecay and Toccoa are the only soils that are partially hydric. The remaining five soils found on the property are not hydric. This study was supported by the Clemson University Creative Inquiry Program.

Poster #156
Will They or Won't They: Secret Telling in Interpersonal Interactions
Faculty Mentor: Robin Kowalski, Psychology
Students: Jessica Dean, Sarah Louderback, Zan Isgett, Kirsten Nielsen, Lauren Carroll

This study investigated the predictors of within-gender secret telling among young adults ages 18 to 25. Sixty-two participants were exposed to either a 'positive' or a 'negative' secret about another individual. Eighteen percent of the participants told the secret, but this did not vary with the secret condition, χ^2 (1) = 0.57, $p > .45$. Participants' willingness to disclose the secret also did not vary with self-concealment (i.e., the dispositional tendency to withhold information), $p > .05$. However, gender did significantly predict the probability of secret telling. Males were significantly more likely to disclose the secret than females. This gender effect may be due to the differing personal relationships that males and females tend to form. Implications of this research for clinical practice will be discussed. Additionally, suggestions for future research will be presented (e.g., cross-gender secret telling).

Poster #157
Evolution of Integral Transforms and Their Applications
Faculty Mentor: Irina Viktorova, Mathematical Sciences
Student: Steven Goodson

In question are the development and the applications of integral transformations. The motivation behind this research is to help students explore modern applications of integral transforms. History, math, and application teams lead the class through discovery of each transform and its applications. Resulting has been a demonstration of how transforms can recover usable data from a convoluted set. In addition, recognition of the broad applications has been presented.

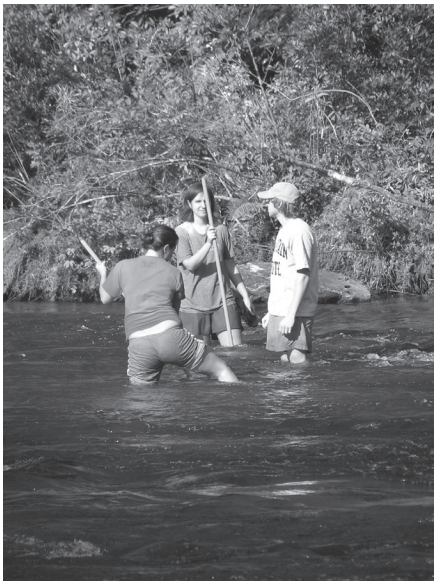
Poster #158
Source Formation of the South Carolinian *Apocopodon* Fossil Ray
Faculty Mentor: John Wagner, Environmental Engineering and Earth Science
Student: Kamil Bakalarz

The goal of this research project is to determine if the Rhems Formation is the source formation for the *Apocopodon* fossil ray species in South Carolina. The *Apocopodon* fossil ray was believed to be only found in Brazil, however specimens that clearly resemble the fossil teeth found in Brazil, have also been found in a lag deposit in Kingstree, South Carolina. However, since the lag deposit contains fossils from various geologic time periods, the source formation is not certain. The Brazilian occurrence was in a formation that is age equivalent to the Rhems Formation in South Carolina. Samples from the Browns Ferry Member of the Rhems Formation and samples from the Williamsburg Formation were looked at for evidence of *Apocopodon*. The *Apocopodon* fossil ray very likely originates from the Rhems Formation based on information known from the Brazilian occurrence and the lack of evidence from the Williamsburg Formation samples. Funding was provided by the Clemson Office of Undergraduate Studies

Poster #159
Mineralogical Investigation of Biotite Augen Gneiss in the Clemson Experimental Forest
Faculty Mentor: Richard Warner, Environmental Engineering and Earth Science
Student: Chaquetta Greene

Little information is known about the origin of the biotite augen gneiss found in the Clemson Experimental Forest. Biotite augen gneiss can be identified by the noticeably larger sized plagioclase feldspar crystals (augens). Through the completion of

several analytical tests, such as a whole rock chemical analysis, the results show that the rock samples tested are granitic in composition. Further testing has concluded that the parent rock of the biotite augen gneiss of the Clemson Experimental Forest is igneous in origin. This information will be vital to understanding the historic geological processes that have formed the rocks of the Clemson Experimental Forest as well as aid in the development of new research projects. This project was sponsored by the Office of Undergraduate Studies at Clemson University.



Poster #160

The Role of Social Capital in Cell Phone Adoption Behavior

Faculty Mentor: Jason Thatcher, Management

Students: Julius McAlpine, Courtney Siffre, Sarah Jones, Adam Stubblefield, Michelle Carter

Cell phones are beginning to take on much more prominent and multi-faceted roles in our lives. Once viewed simply as a replacement landline, cell phones are now used for much more than communicating with friends, family, and coworkers: they are used to send and receive text-messages, carry out mobile banking, listen to music, play games, and browse the internet. These advances require the development of more granulated theory of how individuals adopt and use their cell phones, in both work and social contexts. In our research, we draw on young people's experiences to identify determinants of individuals' different uses of common cell phone features. Further, we investigate how individuals cope when they are prohibited from using a technology that has become embedded in all aspects of their daily lives. We would like to recognize and appreciate the support given to this project by Creative Inquiry at Clemson University.

Poster #161

What Cell Phones Mean in Young People's Daily Lives and Social Interactions

Faculty Mentor: Jason Thatcher, Management

Students: Rachel Hurd, Dustin Demio, Stefan Zollinger, Ciava Liagon, Julius MaAlpine, Carolyn Applefield, Michelle Carter

In this exploratory study, we present a preliminary analysis of narrative accounts written by 72 undergraduate students, to help shed light on what cell phones mean in the daily lives and social interactions of young people. As increasingly people are using and becoming familiar with information and communication technologies (ICTs) in their personal lives before these technologies infiltrate the work space, an understanding of how young people develop emotional connections with their cell phones could provide insight into what ICT use may be like in the future. The narrative accounts provided by study participants elucidate what cell phones mean in young people's lives. Our study reveals that young people become increasingly dependent, and develop deeper emotional ties with cell phones, as usage permeates more aspects of their daily lives and social interactions. We recognize and appreciate the support given to this project by Creative Inquiry at Clemson University.

Poster #162

Awareness and Behavior Related to Environmental Sustainability at Clemson

Faculty Mentor: Scott Templeton, Applied Economics and Statistics, Patricia Zungoli, Entomology, Soil and Plant Science, Cindy Lee, Environmental Engineering & Earth Science

Student: Gabriel Fair

A growing commitment among institutions of higher education is environmental sustainability. Many universities including Clemson have websites supporting their environmental sustainability efforts. The purpose of this study was to optimize the potential of the website to increase awareness and communication within the university about sustainability. Randomly selected faculty, staff, and students were asked to respond to an online survey regarding their behaviors related to sustainability including: frequency of recycling, personal modes of transportation uses of on-line sources of information on environmental sustainability and involvement in environmental awareness activities. The collected data will be used to customize the website to optimize the potential of the website to increase awareness and communication within the university about sustainability.

Poster #163

Popular Science Journalism* CI Generates Science News Articles for Clemson newspaper, *The Tiger

Faculty Mentor: Holly Tuten, Entomology, Soils and Plant Sciences, The Tiger

Students: Rachel Wasylyk, Karl Stefan, Allison Scott, Caitlyn Murphy, Virginia McCuen, Thomas Larrew, Suzannah Isgett

In the spring 2011 *Popular Science Journalism* course, seven undergraduates met weekly to produce science news articles for the Clemson University newspaper, *The Tiger*. Students used primary literature, science journal websites, and interviews with Clemson University researchers to generate topics. Group collaboration, including peer review, was used to refine articles for publication. Short lectures were given on topic choice, story development, literature surveys, common writing mistakes, and interpreting statistics. Students developed skills for critical analysis of factual and anecdotal material, writing, editing, and communication. One article was printed weekly in the Tigri scientifica column starting with issue five. Topics included research news on antibiotics, education, engine design, health effects of laughter, material sciences, multitasking, neuroscience, and prosthetics. All thirty-five articles produced will be printed as a glossy magazine at the end of the spring semester. Representative articles will be presented at the CI poster session.

Poster #164

Chains of Function Delivery: Collective Role for Lean and Concurrent Engineering in Product Design at BMW AG

Faculty Mentor: Dr. Paul Venhovens, Campbell Graduate Engineering Center

Student: Ammar Ahmed

The essence of lean is very simple, but from a research and implementation point of view overwhelming. Lean is the search for perfection through the elimination of waste and the insertion of practices that contribute to reduction in cost and schedule while improving performance of products. Concurrent Engineering is a work methodology based on the parallelization of tasks (i.e. performing tasks concurrently). However, the level of implementation and education of lean in areas like product development is very low and this research will take advantage of this situation.

Impact of lean movement on manufacturing process has been, depending on the industry, anywhere from strong to revolutionary. However, if lean improvements are confined to manufacturing, they will represent only islands of success in a sea of efficiency because from literature and research papers pointed out that improvements in manufacturing alone will make

only a marginal difference in the ultimate system costs. As noted in Womack and Jones's Lean Thinking: "Just as activities that can't be measured can't be properly managed", so the activities necessary to create, order and produce a specific product which can't be precisely identified, analyzed, and linked together cannot be challenged, improved, and, eventually, perfected. Currently there is no technique that explicitly links tolerance to customer relevant function. It is much easier to get things right during design than to fix engineering mistakes later and this project will migrate the concurrent engineering and lean principles from manufacturing and enter into engineering processes with reference to both research literature and implementation of the system in BMW manufacturing plant. In this research we use System Dynamics simulation tool, Design Structure matrix and virtual model is created using 3DCS (Monte Carlo base part Assembly simulation).

Poster #165
Cell Design of New Automated Coating Process
Faculty Mentor: Anand Gramopadhye, Industrial Engineering
Students: Joshua VonFange, Kelly Springfield, Jeff Morgan, Kyle Fetterly, Melissa Zelaya

In partnership with Honeywell's Greer Facility, this capstone design project centered on developing a scale-up automated manufacturing process for a new coating method recently developed within a lab environment. The team first determined the customer needs and process specification for the project, followed by an in-depth cell design concept generation phase. ARENA simulation was used to compare and contrast the different cell designs based upon maximum throughput, cycle time, touch time and square footage. Concepts were then combined, improved or refined and a final round of ARENA simulation was conducted for comparison. The team was then able to determine which cell design performed best with the appropriate machine type and number for each of the steps in the process. As a result, the final automated cell design met both the initial and projected demands for Honeywell, while maintaining cycle time and touch time at a minimum.

Poster #166
Automation and Cell Design for a New Coating Process
Faculty Mentor: Anand Gramopadhye, Industrial Engineering
Students: James White, Julia Sarratt, William Jackson, Romeo Almonds, Melissa Zelaya

In partnership with Honeywell's Greer Facility, this capstone design project centered on developing a scale-up automated manufacturing process for a new coating method recently developed within a lab environment. The team first determined the customer needs and process specification for the project, followed by an in-depth cell design concept generation phase. ARENA simulation was used to compare and contrast the different cell designs based upon maximum throughput, cycle time, touch time and square footage. Concepts were then combined, improved or refined and a final round of ARENA simulation was conducted for comparison. The team was then able to determine which cell design performed best with the appropriate machine type and number for each of the steps in the process. As a result, the final automated cell design met both the initial and projected demands for Honeywell, while maintaining cycle time and touch time at a minimum.

Poster #167
Seasonal Cooking in South Carolina--Fall/Winter Cookbook
Faculty Mentor: Beth Kunkel, Food Science and Human Nutrition
Students: Tracy Smith, Emily Parkman, Will McWhiter, Russell Lamb, Catherine Kent, Kathryn Floyd, Heather Burditt, Jamieson Boyer, Susan Bowles, Lauren Boone, Laura Allen, Nancy Teston, Ana Veloff, Julia Webb

We have created a seasonal cookbook that can be used by everyone which is based on the availability of South Carolina foods in the fall and winter. Our cookbook includes preparation tips, photos, level of difficulty, MyPyramid food groups and

nutrient composition for each recipe. Recipes were provided by family and friends and by modifying previously published recipes to fit our criteria. Currently, we have finished the Fall/Winter section of the cookbook and are beginning to find recipes for the Summer edition. Weekly activities of the creative inquiry team include determining what is in season, finding and refining recipes, testing and tasting recipes, and photographing each item. Our goal is to have three complete sections, Spring, Fall/Winter, and Summer and to market them within the Clemson community. Our project has been supported by Creative Inquiry funds and funds from the sale of our spring cookbook.

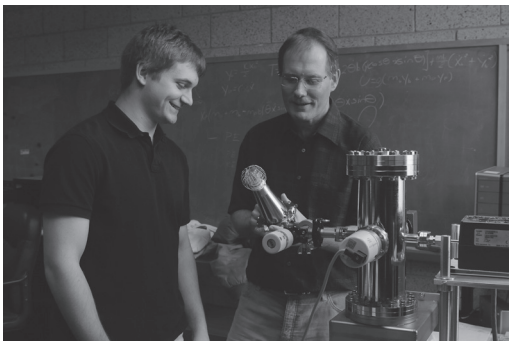
Poster #168
Health Promotion, Physical Activity, and Obesity Prevention in Preschool Children
Faculty Mentor: Janice Lanham, Nancy Meehan, Nursing
Student: Erin Reifeis

While the seriousness of childhood obesity is widely acknowledged by health care providers, success of programs targeted against this malady has been very limited. The focus of this paper will be to explore previously published articles and discuss the potential effectiveness of a newly created instrument. A group of Clemson University Honors Nursing students created an age-appropriate intervention tool for pre school children. The instrument is a coloring book that correlates each letter of the alphabet to a healthy food item or daily activity. Direct observation and open-ended questions will determine if there was an improvement in the preschooler's knowledge level through the use of this coloring book over a one week period. Results will be included once collected.

Poster #169
Health and Business Topics in Film
Faculty Mentor: Graciela Tissera, Languages
Students: Heather Wilson, Laura Thomas, Justin Price, Jessica Graham, Brooks Edwards, Yahaira Aleman, Janey Tupper, Wales Watkins

This project will analyze different perspectives on health and business topics to explore their impact on Hispanic countries and other areas of the world. Students will research historical and cultural aspects of several nations through videos, mass media, and pertinent materials (such as actual footage, film adaptations of novels, documentaries, and movies based on real events) by world renowned authors and film directors.

Poster #170
The Hispanic World: Service Learning Projects
Faculty Mentor: Graciela Tissera, Languages
Students: Jess Meehan, Lauran Poleynard, Somer Stephens, Caitlin Moore, Valerie Cortina, William Harris



This project will analyze social, political, and economic issues in the Hispanic world through videos and pertinent materials. Students will also complete service learning projects to help the growing Hispanic population in the State of South Carolina. Through their service to Hispanic communities, students will explore the impact of culture, immigration, education, language, health, and jobs on family members and their future expectations in multicultural environments.

Poster #171

E-Portfolio Usage in Higher Education

Faculty Mentors: Gail Ring, Undergraduate Studies, Barbara Ramirez, English
Student Mentor: Sarah Becker, Emily Champion, Kathryn Woodwas, Reid Newman

The use of ePortfolios in higher education is increasing throughout the United States. The purpose of this research is to learn how ePortfolios are being used in higher education. Specifically, we are collecting data on whether they are used departmentally or university-wide, and if their purpose is career related (showcase portfolios), assessment related, or for student learning. Although this research is currently in progress, preliminary data suggest that ePortfolios are being used primarily for assessment. This survey of the ePortfolio landscape in higher education will be used to create a working database on this academic tool, information that has not yet been collected. In addition, it will be used to inform the Clemson University ePortfolio Program.

Poster #172

The Effects of Weather Recognition Training on General Aviation Pilot Situation Assessment and Tactical Decision Making When Confronted with Adverse Weather Conditions

Faculty Mentor: Scott Shappell, Industrial Engineering
Student: Kim Chansik

Weather caused the highest portion of general aviation (GA) fatalities, and continued visual flight rules (VFR) into instrument meteorological conditions (IMC) was the main cause of fatalities among weather-related GA accidents. This study aims to evaluate the effects of weather recognition training on GA pilots' situation assessment and tactical decision making under gradually aggravating weather conditions. Pilot situation assessment was evaluated by a post-experiment questionnaire in terms of three dimensions: weather assessment, risk assessment, and decision confidence. Tactical decision making was evaluated by measuring the distance that a pilot has flown from an optimal divert point to an actual divert point. The results showed that WeatherWise training group showed higher situation assessment abilities and tactical decision making abilities than control group.

Poster #173

Palmetto Island: A Virtual World for Development of Technical Excellence, leadership, Community, and Mentoring

Faculty Mentors: Kenneth Weaver, Larry Hodges, School of Computing
Students: Naja Mack, Sanchit Aggarwal, Mathew Gallucci, Charles Jones, Sherece Rouse, Brett Rhyne, Robert Sellers, Sharad Sharma, Ashima Sood

Palmetto Island is an online 3D virtual world for activities that introduce high and middle school students in South Carolina to computing skills, opportunities and IT career options in order to increase the pipeline of future computing majors. Content development and mentoring are done by creative inquiry students who also serve as role models and mentors for recruiting high school students into computing majors. Having a content and capability-rich virtual world for social interaction provides a support system and extracurricular training for students, exposes them to a wide range of computing activities, and provides a set of focused technical projects for students that are motivated by the need to develop interventions to broaden participation in computing. This approach also solves the logistics problems involved in when training, supporting, and mentoring activities can only been done at a physical location. This research is sponsored by Dr. Kenneth Weaver.

Poster #174
Metrics that Motivate Assembly line Mechanics – Team 2
Faculty Mentor: Anand Gramopadhye, Industrial Engineering
Students: Jennifer Jones, Jordan Hinson, Elizabeth Bradford, Rachael Bedosky, Chalil Madathil Kapil

This project is illustrative of the application of user-centered iterative design for the development of metrics for motivating mechanics of the Boeing Company. The objective of this project is to develop a set of metrics that a mechanic owns in order to show how they personally affect the bottom line. Through systematic interviews, shadowing and needs analysis, the team developed concepts of different metrics which could be used to motivate the mechanics. These concepts underwent formative usability testing and iterative refinement. Based on these tests, the team established a set of key metrics that showed the most potential for motivating mechanics.

Poster #175
Metrics that Motivate Assembly line Mechanics – Team 1
Faculty Mentor: Anand Gramopadhye, Industrial Engineering
Students: Shelley Stokes, Courtney Hines, Justin Harris, Davis Cress, Chalil Madathil Kapil

This project is illustrative of the application of user-centered iterative design for the development of metrics for motivating mechanics of the Boeing Company. The objective of this project is to develop a set of metrics that a mechanic owns in order to show how they personally affect the bottom line. Through systematic interviews, shadowing and needs analysis, the team developed concepts of different metrics which could be used to motivate the mechanics. These concepts underwent formative usability testing and iterative refinement. Based on these tests, the team established a set of key metrics that showed the most potential for motivating mechanics.

Poster #176
Exploration of Applications of Robotics in Biomedical Engineering
Faculty Mentors: Delphine Dean, David Kwartowitz, Bioengineering
Students: Timothy Laird, Miller Byrd, Fuad Mefleh, Joe Connolly, Jacson Turbeville, Alex Owczarczak, Nolan Horrall

Our Creative Inquiry team explores the application of robotics in bioengineering. We are focusing on projects that involve using the electrical signals given off by the brain and muscles (i.e. EEG's, and EMG's) as controls for various mechanical systems. Members have successfully prototyped an EMG controlled servo motor for basic applications. Members of the team have also constructed a locomotive robot controlled by a neural headset and slot cars that are controlled by muscle contractions. Practical applications for these devices controlled from physiological signals include a mechanism for remotely opening and closing doors, EMG interfaced entertainment, and military applications such as a neural guided helicopter with visual feedback. We intend to further pursue more advanced devices. These projects are intended to demonstrate the ability to apply inexpensive, consumer-grade electronics into a practical biometrically controlled device.

Poster #177
MindBot2: Improved Consumer-Grade Neural Robotics
Faculty Mentor: Delphine Dean, Bioengineering
Students: Miller Byrd, Timothy Laird

The project is based on the idea of controlling robotic devices with biometric signals, such as the electrical signals given off by muscle contraction and brain activity (EMG's/EEG's). In general the device allows a user to remotely navigate a robot via EMG/EEG inputs and video feedback. The robot is a combination of VEX robotic components and a Bluetooth receiver, while navigation is controlled by an Emotiv EPOC neural-headset through custom software. A core part of the system requires that messages from the neural headset be broadcasted wirelessly through a host system to the robot, which in turn provides visual and sensory feedback to the user. The purpose of this work is to further demonstrate the capacity of consumer-grade brain-computer interfaces, as well as suggest that robotic-assisted devices for the physically impaired can be enhanced with relatively cost-effective neural technology.

Poster #178
Mapping Pegmatite Dikes in the Clemson Experimental Forest
Faculty Mentors: Richard Warner, Scott Brame, Environmental Engineering and Earth Science
Student: Austin Hodge

Mineralogically, a majority of the pegmatites contained varying percentages of feldspar, quartz, and muscovite/biotite mica. However, two pegmatites were found to have unusual minerals in them, a previously discovered pegmatite and the Maw Bridge Pegmatite. I would like thank the Office of Undergraduate Studies at Clemson University, Creative Inquiry Program, for allowing me to undertake this research venture. With each rock that I have mapped, comes ever-increasing understanding of the geology beneath the Clemson Experimental Forest.

Poster #179
Evolution of Gingerbread: Developing a Gluten Free Recipe
Faculty Mentor: Aubrey Coffee, Food Science and Human Nutrition
Student: Audrey Boushell

The objective was to develop an original recipe that provides the benefits of being gluten free while maintaining the expected and desirable flavor and texture or traditional gingerbread. An original and highly unsatisfactory gluten free recipe was used to begin the research. The recipe was gradually altered, making one change at a time. All changes were carefully recorded so as to be reproducible. A team of food science students and mentoring professor analyzed the changes and compared product variations over time. The final recipe provided the desirable flavor and texture characteristics while remaining gluten free. The product kept its integrity when made in a different kitchen environment. The recipe shows that delicious homemade gingerbread is obtainable even when gluten free. All ingredients are easily found in grocery chains and no special tools are needed. The recipe, like a well-written experiment, is repeatable and reliable.

Poster #180

Practitioner Willingness to Discuss Sexual Issues with Female Patients Post Breast Cancer Diagnosis

Faculty Mentors: Stephanie Davis, Nancy Meehan, Nursing
Students: Jenna Baker, Melinda Davis, Melissa Spicer

Communication plays a pivotal role in the relationship between patients and healthcare workers in determining the course of action to achieve a higher or more balanced health status. The purpose of this research was to replicate a pilot study designed to examine practitioner (physician, physician assistant, and nurse practitioner) willingness to discuss sexual issues with their female patients.

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